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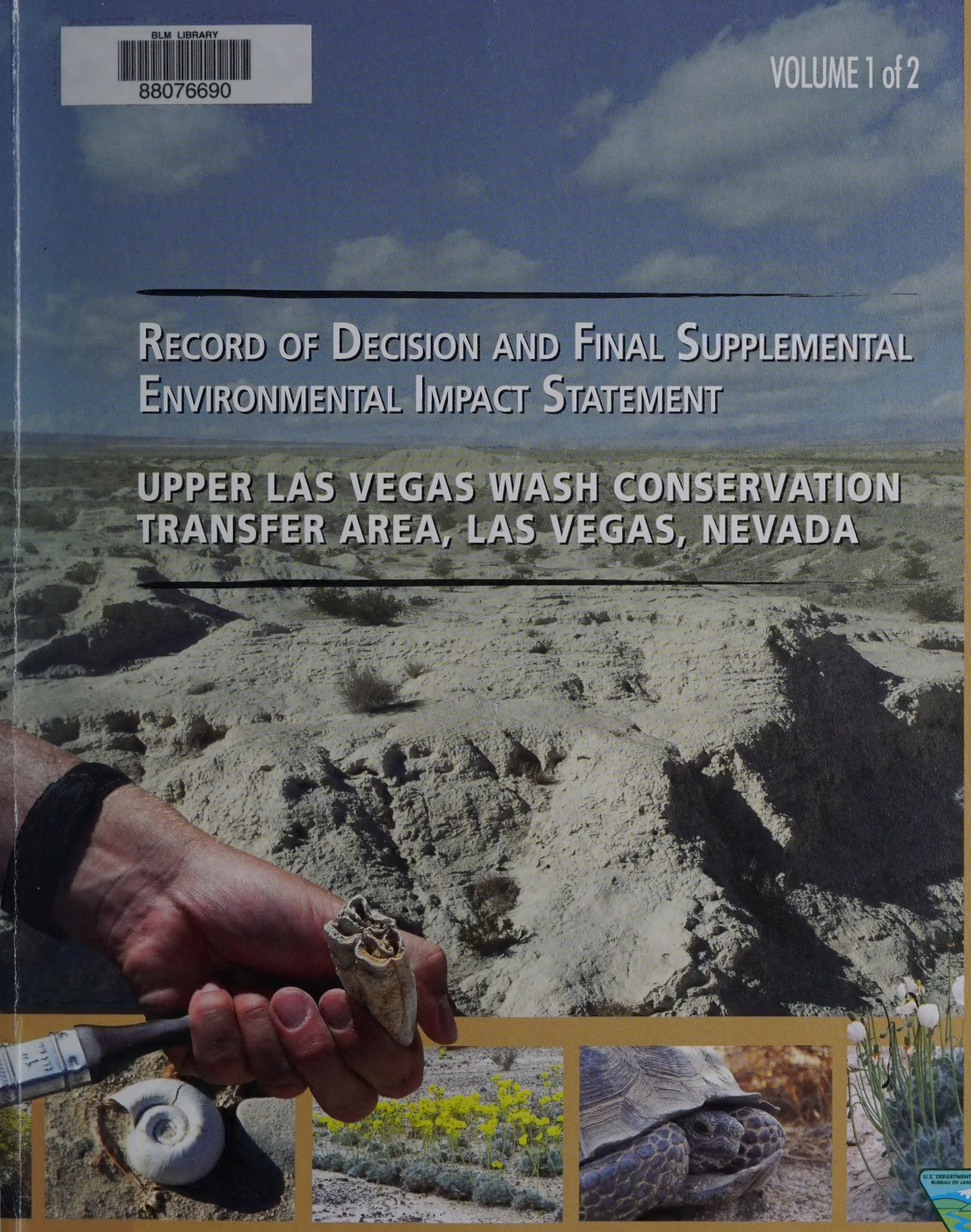
VOLUME 1 of 2

Record of Decision and Final Supplemental Environmental Impact Statement

Upper Las Vegas Wash Conservation Transfer Area, Las Vegas, Nevada



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MISSION STATEMENT

"The Bureau of Land Management is responsible for stewardship of our public lands. The BLM is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield of our Nation's resources within the framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife habitat, wilderness, air, and scenic quality, as well as scientific and cultural values."

BLM/NV/LV/ES/11-23+1793

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Southern Nevada District Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89130

http://www.blm.gov/nv/st/en/fo/lvfo.1.html

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In Reply Refer to:
2710 (LLNVS00520)

Dear Reader:

Enclosed for your review is the Final Supplemental Environmental Impact Statement (SEIS) for the Upper Las Vegas Wash Conservation Transfer Area (CTA), which describes and analyzes the potential environmental impacts of six alternatives for the final boundary of the CTA, managed by the Bureau of Land Management (BLM).

The BLM Las Vegas Field Office is the lead agency for the SEIS, with cooperation from the U.S. Fish and Wildlife Service, Federal Highway Administration, Las Vegas Paiute Tribe, City of Las Vegas, Clark County, Nevada Department of Transportation, and City of North Las Vegas. The Final SEIS has been prepared in conformance with requirements of the 2004 *Final Las Vegas Valley Disposal Boundary Environmental Impact Statement* (FEIS) and Record of Decision (ROD), which called for "a process of more study, collaboration, and further NEPA analysis, as needed, and approval of a conservation agreement, if signed, prior to any transfer of title" (BLM 2004b:1). Determination of a final CTA boundary is needed because of the significance of paleontological, botanical, hydrologic, and cultural resources present within the CTA study area. The final CTA boundary was not established in the FEIS ROD, which states, "It is intended that the boundary of the CTA be adaptable to the needs and concerns of interested parties that participate in the development of the conservation, including community land use planning" (BLM 2004b:2). Six alternatives for boundaries are analyzed, ranging from approximately 13,000 acres to less than 1,500 acres.

The availability period of the Final SEIS will be for 30 days following the date of the U.S. Environmental Protection Agency (EPA) publication of the Notice of Availability (NOA) of this Final SEIS in the *Federal Register*. As allowed by 40 Code of Federal Regulations (CFR) §506.10(b), the BLM is announcing its decision and publishing the ROD concurrently (copy attached) with this Final SEIS. The ROD, with appropriate approval signatures, is posted on the project web site (http://www.blm.gov/nv/st/en/fo/lvfo.html). You may submit comments on the Final SEIS and ROD to:

- BLM Web Site: http://www.blm.gov/nv/st/en/fo/lvfo.html
- Email: NV_SNDO_Planning@blm.gov
- Fax: (702) 515-5023
- Mail: Bob Ross, Field Manager, BLM Las Vegas Field Office, 4701 North Torrey Pines Drive, Las Vegas, NV 89130-2301

As a member of the public, you have the right to appeal the BLM's decision, in accordance with the regulations contained in 43 CFR Part 4, if the decision is adverse to you and you believe the decision is incorrect. If you appeal, the following procedures must be followed:

- The Notice of Appeal must be in writing and filed (postmarked) within 30 days of the date of the publication of the EPA's NOA in the *Federal Register*.
- You must fully state your reasons for appealing the decision.

- The Notice of Appeal must be addressed to the Field Manager, with a copy to the Regional Solicitor and the Interior Board of Land Appeal at the following addresses:

  Las Vegas Field Manager
  BLM Las Vegas Field Office
  4701 North Torrey Pines Drive
  Las Vegas, NV 89130-2301

  Office of the Regional Solicitor
  Pacific Southwest Region
  2800 Cottage Way, E-1712
  Sacramento, CA 95825

  Interior Board of Land Appeal
  Office of Hearings and Appeals
  801 North Quincy Street, Suite 300
  Arlington, VA 22203

In accordance with 43 CFR §4.21, you may file a petition for a stay of the effectiveness of the approved ROD, pending review of your appeal. A petition for a stay must accompany your Notice of Appeal and show sufficient justification based on relative harm, likelihood of success on the merits, immediate irreparable harm if the stay is not granted, and whether the public interest favors granting the stay.

The BLM appreciates your interest in this project. If you have any questions on this matter, please contact Gayle Marrs-Smith, SEIS Project Manager, at (702) 515-5156.

Sincerely,

Robert B. Ross, Jr.
Field Manager
Las Vegas Field Office

#1565026981 ID:88076690

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FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

Upper Las Vegas Wash Conservation Transfer Area
Clark County, Nevada

Lead Agency: U.S. Department of the Interior, Bureau of Land Management

Type of Action:

Draft	( )	Final	(X)
Administrative	( )	Legislative	( )

Jurisdiction: Southern Nevada District Office, Las Vegas Field Office, Nevada

Abstract

This Final Supplemental Environmental Impact Statement (SEIS) analyzes the environmental effects of the possible boundary adjustments on the Upper Las Vegas Wash Conservation Transfer Area referenced in the 2004 *Final Las Vegas Valley Disposal Boundary Environmental Impact Statement* and Record of Decision.

The Bureau of Land Management (BLM) Preferred Alternative boundary is 10,670 acres. The boundary provides for the protection of the natural functioning of the Upper Las Vegas Wash and sensitive resources while offering 2,654 acres of lands for disposal and private development. The BLM Preferred Alternative maintains existing stormwater volume, velocity, and depth, along with sediment load, flow location, and flow pattern of stormwater moving down the alluvial fans of the Sheep and Las Vegas ranges. The BLM Preferred Alternative protects the fossils within the Las Vegas Formation, Native American resources within the wash, ephemeral wash plant communities, and sensitive plant habitats.

The Final SEIS also analyzes a No-Action Alternative (as required under the National Environmental Policy Act) that would consist of 1,448 acres and would only include the BLM portion of the Tule Springs National Register Site and the Eglington Preserve. Under the No-Action Alternative, the remaining lands in the Conservation Transfer Area study area would be available for disposal in accordance with the Southern Nevada Public Land Management Act, Federal Land Policy Management Act, and other applicable laws, subject to valid existing rights. Other alternative boundaries consist of Alternative A, at 12,953 acres; Alternative C, at 6,362 acres; Alternative D, at 5,301 acres; and Alternative E, at 3,314 acres. These alternatives were developed in response to issues and concerns raised during stakeholder meetings, cooperator meetings, and public scoping in order to consider the various objectives of stakeholders, which ranged from maximum development opportunities to maximum conservation.

Comments and/or appeals on this Final SEIS must be received via email at NV_LVFO_Planning@nv.blm.gov, or be postmarked no later than 30 days after the U.S. Environmental Protection Agency publication of the Notice of Availability in the *Federal Register*.

Record of Decision and Final Supplemental Environmental Impact Statement

Upper Las Vegas Wash Conservation Transfer Area Las Vegas, Nevada

U.S. Department of the Interior
Bureau of Land Management, Las Vegas Field Office

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RECORD OF DECISION

The approval of this Record of Decision for the Upper Las Vegas Wash Conservation Transfer Area final Supplemental Environmental Impact Statement completes the environmental analysis process for this project. The action enables the Bureau of Land Management to continue to manage for the protection of sensitive resources in the Conservation Transfer Area study area while making lands available for disposal, and future private development.

This Record of Decision incorporates by reference the Upper Las Vegas Wash Conservation Transfer Area Final Supplemental Environmental Impact Statement and sets the final boundary for the Conservation Transfer Area.

This document meets the requirements for a Record of Decision, as provided in 40 Code of Federal Regulations (CFR) 1505.2, and follows the guidance in 40 CFR 1506.10(b)(2), which authorizes the BLM to run the 30-day availability period concurrent with the 30-day appeal period.

Appeal procedures are identified at the end of this Record of Decision.

U.S. Department of the Interior, Bureau of Land Management
Las Vegas Field Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130-2301
Telephone: (702) 515-5000

Approved by: _____ 10/21/11
Field Manager, Las Vegas Field Office — Date

RECORD OF DECISION

RECORD OF DECISION

Final Supplemental Environmental Impact Statement
Upper Las Vegas Wash Conservation Transfer Area

Introduction

This document constitutes the Record of Decision (ROD) of the U.S. Department of the Interior, Bureau of Land Management (BLM), Las Vegas Field Office, Nevada, for the *Upper Las Vegas Wash Conservation Transfer Area Final Supplemental Environmental Impact Statement* (Final SEIS). During preparation of the *Las Vegas Valley Disposal Boundary Final Environmental Impact Statement* and Record of Decision (LVVDB FEIS/ROD) (BLM 2004a), sensitive biological, cultural, paleontological, and hydrological resources were identified along the Upper Las Vegas Wash (ULVW) within the Conservation Transfer Area (CTA) in the northern part of the Las Vegas Valley, and the LVVDB FEIS/ROD required a supplemental analysis of the area. Determination of the final CTA boundary is analyzed in this Final SEIS. The Final SEIS was prepared pursuant to Council of Environmental Quality (CEQ) regulations [Code of Federal Regulations (CFR) 1500–1508] implementing the procedural requirements of the National Environmental Policy Act (NEPA), U.S. Department of the Interior guidance, and the BLM NEPA Handbook, H-1790-1.

The analysis in the Final SEIS is supplemental to the analysis contained in the LVVDB FEIS/ROD. The analysis assessed the environmental impacts to the various natural and socioeconomic resources identified during the scoping process that were not sufficiently analyzed in the LVVDB FEIS/ROD and that are specific to land within the approximately 13,600-acre CTA study area. These impacts are quantified in the Final SEIS to allow the BLM to determine the final boundary of the CTA.

The BLM has issued this ROD concurrent with the Final SEIS, as allowed under 40 CFR 1506.10(b); thus, review of the Final SEIS and the time period in which to appeal this decision run concurrently. There will be no implementation actions approved during the 30-day concurrent review and appeal period of the Final SEIS and ROD.

Background

To address issues associated with the need for developable lands and the management of public lands, Congress passed the Southern Nevada Public Land Management Act (SNPLMA) in 1998 [Public Law (PL) 105-263]. The SNPLMA authorized the United States Department of the Interior Bureau of Land Management (BLM) to dispose of federal lands in Clark County, Nevada, consistent with applicable law, population growth, and community land use plans and policies. In 2002, the Clark County Conservation of Public Land and Natural Resources Act (Clark County Act) [PL 107-282] amended the SNPLMA to expand the Las Vegas disposal boundary area to address the continuing increased growth rates in the Las Vegas region. The public lands that became available for disposal were primarily located in the northern and southern portions of the Las Vegas Valley. The northern area encompasses the ULVW and is bordered by Nellis Air Force Base to the east, the DNWR to the north, and the Red Rock Canyon National Conservation Area and Paiute Reservation to the west.

The BLM Las Vegas Field Office prepared the LVVDB FEIS in 2004 to identify the environmental consequences that could result from the disposal and use of the remaining BLM-managed lands within the disposal boundary. During preparation of the LVVDB FEIS, sensitive biological, cultural, paleontological, and hydrological resources were identified along the ULVW in the northern part of the

Las Vegas Valley. The LVVDB ROD for the LVVDB FEIS (ROD No. FES 04-048) selected the Conservation Transfer Alternative.

The Conservation Transfer Alternative allows the BLM to dispose of approximately 46,700 acres of lands in the Las Vegas Valley for future growth of the cities of Las Vegas and North Las Vegas (hereafter referred to as "the Cities"). The LVVDB ROD stated that the BLM would conduct additional study, collaboration, and environmental analysis of approximately 5,000 acres that have been withheld from sale because of their high concentration of sensitive resources. Additionally, the LVVDB ROD indicated the CTA boundary should be adaptable, meaning that it could be increased or decreased in size to meet the purpose and need. During public meetings, it was evident that many members of the public were interested in protecting an area much greater than 5,000 acres, including the alluvial fan north of the wash. Therefore, in the Final SEIS the CTA study area encompasses 13,622 acres and stretches east from U.S. Highway 95 near the Paiute Reservation to approximately 4 miles west of Interstate 15. The DNWR is directly north, and the southern boundary roughly approximates the southern edge of the ULVW. This Final SEIS is a mandatory step in implementing the decision of the ROD for the LVVDB FEIS. The BLM reviewed the LVVDB FEIS/ROD, the results of the Utah State University Report, and all input and recommendations from the cooperating agencies and the various stakeholders in determining a final CTA study area boundary that would allow consideration of the various objectives of stakeholders, which ranged from maximum development opportunities to maximum conservation.

The Bureau of Land Management's Decision

The BLM selects the Alternative B boundary as the agency's Proposed Action (see attached map). Revised from the draft SEIS, Alternative B includes the Las Vegas Formation, sensitive cultural and botanical resources, the active wash and 100-year floodplain, and the alluvial fan north of the wash to the Desert National Wildlife Refuge (DNWR) boundary. This Alternative includes the Eglington Preserve but does not include the Tule Springs state lands. Alternative B consists of 10,669 acres compared with 11,007 acres of the Alternative B (Preferred Alternative) published in the Draft SEIS. Revisions to the Alternative B boundary in the Draft SEIS are based in part on input from the City of Las Vegas and the Las Vegas Paiute Tribe. Northwest of the Las Vegas Paiute Reservation (Paiute Reservation), the boundary of the Alternative B was adjusted to be offset 700 feet from the Las Vegas Formation and run north to the edge of the disposal boundary. This 700-foot open space would allow for points of access into the wash and compatible future uses, reducing impacts to the fossil formation. After the Final SEIS was prepared for printing, the Las Vegas Paiute Tribe requested 174 acres adjacent to the northeast corner of the Paiute Reservation be included in the CTA as important open space to protect the viewshed; therefore, while acreage totals may not match those stated in the Final SEIS, the correct acreages are reflected in this Record of Decision. After these adjustments, a total of 338 acres was removed from the Alternative B boundary published in the Draft SEIS; the 338 acres would be available to the City of Las Vegas for future private development. Alternative B includes a total of 2,654 acres in the CTA study area that would be available for future private development; this acreage would not be subject to the requirements of a BLM-approved Conservation Agreement. The lands available for disposal include 2,654 acres within the jurisdiction of the City of Las Vegas and 373 acres within the jurisdiction of the City of North Las Vegas. There are no other changes to Alternative B as described in the Draft SEIS.

No decisions on allowable uses or alternative managing entities are being made by the BLM at this time.

The BLM's decision is in conformance with the Las Vegas Resource Management Plan/Final Environmental Impact Statement (RMP/FEIS), approved on October 5, 1998. In addition, BLM's decision is consistent with the Federal Land Management Policy Act (FLPMA), Southern Nevada Public Land Management Act (SNPLMA) as amended, and the LVVDB FEIS/ROD.

Alternatives Considered

Six alternative boundaries, including the No-Action Alternative, were evaluated in the Final SEIS. Each alternative was developed to implement the requirements of the ROD for the LVVDB FEIS to determine a final CTA boundary. Each alternative boundary leaves different acreages of land outside the CTA available for disposal and future subsequent development consistent with SNPLMA, which provides for the disposal of public lands, in accordance with other applicable laws.

Alternative A, at 12,953 acres, is the environmentally preferable alternative and includes the Las Vegas Formation, sensitive cultural and plant resources, the active wash and 100-year floodplain, the adjacent upper alluvial fan, and a 1-mile resource protection zone around the northern and eastern boundaries of the Paiute Reservation. Alternative A includes the Eglington Preserve but does not include the Tule Springs state lands. Stakeholders interested in protecting the maximum number of acres possible assisted in the development of Alternative A during early public meetings.

Alternative B, BLM's Preferred Alternative, was revised from the 11,007-acre boundary published in the Draft SEIS to 10,669 acres based on input from cooperating agencies. The revised Alternative B includes the Las Vegas Formation, sensitive cultural and botanical resources, the active wash and 100-year floodplain, and the alluvial fan north of the wash to the boundary of the DNWR. The revised Alternative B includes the Eglington Preserve but does not include the Tule Springs state lands. Northwest of the Paiute Reservation, the boundary is offset 700 feet from the Las Vegas Formation and runs north to the edge of the disposal boundary. The revised Alternative B includes 174 acres adjacent to the northeast corner of the reservation. BLM's revised Preferred Alternative results in 338 acres being removed from Alternative B published in the Draft SEIS and a total of 2,654 acres is available for future development.

Alternative C, at 6,362 acres, includes the Las Vegas Formation, sensitive cultural and botanical resources, the active wash and 100-year floodplain, and a portion of the adjacent upper alluvial fan. Alternative C includes the Eglington Preserve but does not include the Tule Springs state lands.

Alternative D, at 5,301 acres, includes most of the Las Vegas Formation, the sensitive cultural and rare plant resources, and the active wash. Alternative D does not include the Eglington Preserve but does include the Tule Springs state lands. Alternative D was the CTA boundary published in the LVDB FEIS/ROD.

Alternative E, at 3,314 acres, includes some of the Las Vegas Formation, the sensitive cultural and rare plant resources, and part of the active wash. Alternative E does not include the Eglington Preserve but does include the Tule Springs state lands. The Cities of Las Vegas and North Las Vegas (Cities) assisted in the development of Alternative E during early public meetings.

The No-Action Alternative is 1,448 acres and only includes the BLM portion of the Tule Springs National Register Site and the Eglington Preserve. Under the No-Action Alternative, the remaining lands in the CTA study area would be available for disposal, in accordance with SNPLMA, FLPMA, other applicable laws, subject to valid existing rights and stipulations established by the Conservation Agreement.

During the public comment period, the Cities proposed an additional alternative, Alternative D2, which at 5,800 acres was between the range of existing alternatives analyzed in the Draft SEIS. Because D2 was between two alternatives previously analyzed, it was not further analyzed in the Final SEIS.

Management Considerations

Management goals and objectives for the CTA were defined in the LVVDB FEIS/ROD and refined during numerous public meetings for the SEIS. Based on management goals and objectives, the BLM developed the following vision for the CTA:

The CTA preserves the natural functioning of the Upper Las Vegas Wash, protects the sensitive resources within, and supports education, research, and low-impact recreational use. The CTA is ecologically functional to the maximum extent possible and managed to ensure the long-term integrity of the Las Vegas Formation and associated fossil beds, the rare plant habitat for the Las Vegas bearpoppy, Merriam's bearpoppy, and Las Vegas buckwheat, as well as natural flood water capacity for present and future generations.

Alternative B achieves the BLM's goals and objectives and the BLM vision for the CTA, to protect sensitive resources, while meeting the purpose of and need for action to define a final CTA boundary. Additionally, Alternative B allows for disposal of up to 2,654 acres for future private development as authorized within the CTA study area. All practicable methods to reduce environmental harm have been incorporated into this decision.

The BLM would continue to manage resources within the CTA until such time as a local government entity, non-governmental organization, or private party enters into a Conservation Agreement with the BLM. Such an agreement would stipulate mitigation measures and other requirements to provide for the long-term protection of sensitive resources in the CTA. The BLM would be able to dispose of lands within the CTA once such an agreement is developed and signed.

The primary management considerations as defined in the purpose and need of the Final SEIS that will factor into this decision and the development of the Conservation Agreement for the CTA are described below.

The final CTA boundary includes habitat for the Las Vegas bearpoppy, Merriam's bearpoppy, and the Las Vegas buckwheat. The Las Vegas bearpoppy is a State of Nevada Critically Endangered plant species. Merriam's bearpoppy is a BLM special status species. The Las Vegas buckwheat is a candidate for listing under the Endangered Species Act of 1974, as amended. Any loss of habitat would affect the long-term viability of the species. The conservation of lands in the final CTA boundary will minimize fragmentation of available habitat for all species. Additionally, mitigation actions will be required for any activity or project that could impact habitat for these species.

Paleontological resources in the CTA are regionally significant. The Las Vegas Formation contains locally abundant and highly diverse assemblages of fossil vertebrates, mollusks, and fishes that represent both extinct and extant taxa.

Lands within the CTA and the ULVW represent a significant cultural landscape to the Southern Paiute people. The Las Vegas Paiute Tribe considers the ULVW an important part of their cultural and spiritual identity as it served as a migration corridor and was used for burials.

The ULVW serves as a natural flood control feature. Any urban development occurring north of the wash would require major flood control structures to control stormwaters. Although facilities could be designed that would capture water from smaller (2-5 year) flood events, facilities to control larger but less frequent events (like the 100-year storms) would alter the natural functioning of the wash removing or altering flow patterns, changing erosional patterns, water infiltration, and alter ephemeral wash plant communities. Protecting the alluvial fan north of the ULVW from development will reduce the demand for flood control infrastructure. Urban development would also require access roads, utilities, and

associated flood control structures that would directly impact fossil, plant, and cultural resources. Development would also concentrate public access in areas that now are inaccessible and increase indirect impacts to sensitive resources. Without urban development on the alluvial fans, the ULVW has sufficient natural flood control capacity.

Although not a cooperating agency, the Nellis Air Force Base (AFB) complex, including Nellis AFB, Creech AFB, Tonopah Test Range Airfield, and Nevada Test and Training Range (NTTR) was strongly supportive of a CTA boundary alternative that would protect critical airspace between Las Vegas and the NTTR for low-level military flight arrival, departure, and training routes. Alternative B is consistent with the mission operations of the Nellis AFB complex because the alluvial fan north of the wash is included in the CTA boundary and would not be disposed for urban development.

Mitigation and Monitoring

The BLM will require mitigation and monitoring measures to minimize impacts to resources caused by future allowable uses in the CTA as determined on a case-by-case basis and through revisions to the Southern Nevada District Resource Management Plan. The following measures will be incorporated into the Conservation Agreement for the CTA.

Soil Resources

- Use specialized low-surface impact equipment (e.g., vehicles with balloon tires) for off-road access, where travel on foot is not feasible, in order to protect fragile soils and other resource values.
- Salvage and reapply topsoil from construction activities as appropriate during reclamation.
- Comply with county, state, and federal standards for implementation of erosion controls. Apply appropriate erosion control practices, such as silt fences and check dams, near disturbed areas where appropriate.
- Identify areas that need to be avoided in the CTA to protect the Las Vegas Formation, sensitive plant habitat, and wash resources.
- Restore human-caused disturbances to soils in order to prevent habitat fragmentation, soil erosion, and loss of nutrients.
- Use native species in restoration to stabilize surfaces.
- Avoid soil disturbance in Las Vegas buckwheat, Las Vegas bearpoppy, and Merriam's bearpoppy habitat in order to manage for sustainable natural populations.

Water Resources

- Design land uses to minimize disturbance to the ULVW.
- Design approved roadways to allow natural floodwaters from the alluvial fan between the Sheep Mountain and Las Vegas ranges and the ULVW to flow in a natural fashion; this could include elevating roads, creating appropriate dissipation structures with outflow phalanges, and installing porous pavement.
- Avoid modifying the ULVW, such as armoring (e.g., rip rap), channeling, diversion structures, detention basins, etc., in the design and construction of new projects and land uses.
- Maintain natural ecosystem processes, including surface flows, wind/water erosion and deposition, and nutrient cycling, when designing projects.
- Protect natural drainages when considering land use authorizations. Land use authorizations, including recreational permits, should be designed to minimize impacts to wash resources.

- Develop an In Lieu Fee Mitigation Program under the Clean Water Act that defines protection, enhancement, restoration, and monitoring actions for identified jurisdictional waters. Work with non-government organizations and the U.S. Army Corps of Engineers to establish the program.
- Engineer land use authorizations to protect the washes and provide for the hydrologic and biological functioning of the system.
    - Design roads to span washes and/or leave wash bottoms undisturbed.
    - Construct gabions, water bars, and other low-impact flood control structures outside the ULVW, or in less sensitive areas within the CTA, only if necessary, to reduce human-caused impacts to sensitive resources.
    - Coordinate with the Clark County Regional Flood Control District to establish an erosion monitoring program in key areas to track changes in erosion patterns that could negatively impact plant and paleontological resources as part of the conservation strategy agreement.

Vegetation

- Develop procedures to reduce or eliminate impacts to special-status plant species. Measures could include relocating project facilities outside plant habitat, collecting seeds, salvaging topsoil, and propagating and planting native material.
- Identify areas that should be avoided for activities or land uses to protect sensitive plant resources.
- Land uses should be designed to the smallest footprint necessary.
- Restore disturbed habitat. Develop and implement habitat restoration protocols to restore and minimize negative impacts of authorized projects to sensitive plant species. Include actions that will identify revegetation, soil stabilization, and erosion reduction measures to ensure successful restoration of temporary construction areas. Require that restoration occur as soon as possible after completion of activities to speed up recovery of natural habitats.
- Control noxious weeds and invasive species. Develop actions that address weed inventory and monitoring, as well as education of personnel on weed identification, the manner in which weeds spread, and methods for treating infestations. Establish and implement weed protocols for reducing weed introductions from construction vehicles and equipment that are arriving from locations with known invasive vegetation problems. Protocols include establishing a controlled inspection and cleaning area, visually inspecting construction equipment arriving at the construction area, and ensuring that invasive propagules and seeds are removed from tires and other equipment surfaces.
- Protect natural ecological processes, such as pollinator movement, natural wind flow patterns, surface water flows, etc., that maintain sustainable populations by providing connectivity between populations in evaluating land uses.
- Maintain open spaces and corridors between populations when considering land uses.
- Establish long-term monitoring studies for the Las Vegas bearpoppy, Merriam's bearpoppy, and Las Vegas buckwheat to track recruitment, population viability, and life history. Establish thresholds to detect declining populations and trigger additional conservation actions to be implemented when these ecological thresholds are hit as part of the conservation strategy agreement.
- Ensure that developments and land uses are compatible with the long-term protection of the sensitive plant species, including avoidance of habitat or application of meaningful mitigation.
- Restore existing and new land disturbances in sensitive plant habitat.

- Use stockpiled native soils and salvaged native plant material.
- Use native species in approved developments within the CTA.

- Provide protection to sensitive plant habitat from activities such as illegal motorized use, dumping, trespassing, and other invasive uses through fencing, cleanup, or education.
- Provide ecological connectivity between the Eglington Preserve and the CTA to the extent possible.

Educational and Recreational Opportunities

- Provide compatible educational, recreational, and interpretive opportunities in order for the public to enjoy and appreciate the unique resources of the CTA.
- Design uses, including recreational permits, to minimize impacts to sensitive resources.
- Appropriately interpret the Tule Springs site while protecting the historical and paleontological resources.
- Support studies and interpretation of the fossil resources in the CTA.
- Develop environmental education and interpretive programs for paleontological, cultural, and rare plant resources when such actions are consistent with the protection of the ULVW.
  - Locate uses in areas that reduce impacts to sensitive resources.
  - Develop ongoing public information and interpretation of the Las Vegas bearpoppy, Merriam's bearpoppy, Las Vegas buckwheat, cultural, and paleontological resources.
- Establish a non-motorized trail system, compatible with the protection of sensitive resources, for the enjoyment of the public. Provide interpretation to recreational users.
  - Locate trails and structures (kiosks, staging areas, restrooms, parking facilities, etc.) such that they do not conflict with the management of sensitive resources.
  - Uses, including recreational permits that are compatible with sensitive resource management goals, should be designed to minimize impacts.

Cultural Resources

- The cultural sites that were identified in the CTA for the LVVDB FEIS/ROD have been mitigated as recommended by the BLM and approved by the State Historic Preservation Office. Additional protection for undocumented cultural resources and cultural landscapes throughout the CTA is necessary. The BLM will work with the Southern Paiute and other entities to develop mitigation measures, including educational programs, for inclusion in the Conservation Agreement to ensure successful continued protection.
- Consult with Indian Tribal Governments early in the process to identify issues regarding any proposed developments, including issues related to the presence of cultural properties, access rights, disruption to traditional cultural practices, and impacts to visual resources important to the tribes.
- Address the education of workers and the public to make them aware of the consequences of unauthorized collection of artifacts and destruction of property on public land.
- Protect the Las Vegas Formation, including the paleontological, geological, and cultural resources.
- Protect cultural resource sites and paleontological areas so that they are kept undisturbed and unfragmented.
- Provide mitigation and treatment for all paleontological and cultural resource sites that cannot be preserved in situ.

- Protect the 1,125-acre Tule Springs site, as defined in the National Register of Historic Places (NRHP) nomination form.[1] The Tule Springs site has national significance in our country's history and should be protected from destruction or impairment. Ensure that actions on BLM land do not conflict with the preservation of historic resources within Tule Springs.
- Cooperate with the Nevada Division of State Parks on the Tule Springs state lands, an inholding within the 1,125-acre Tule Springs site, to ensure consistency with management actions on BLM lands through a cooperative management agreement.
- Provide mitigation and treatment for all paleontological sites, cultural resource sites, and rare plants that cannot be preserved in situ.
- Protect Native American traditional use areas.
- Evaluate and, if significant, nominate a Traditional Cultural Property for the ULVW, working closely with the tribes.
- Appropriately manage areas that have been identified as being sensitive to the Southern Paiute tribes, including the Las Vegas Paiute Tribe.
- If cultural resources are present at the site, or if areas with a high potential to contain cultural material have been identified, a Cultural Resources Management Plan shall be developed. The plan shall do the following:
    - Establish a cultural resources monitoring program; and
    - Identify measures to prevent potential looting/vandalism or erosion impacts.

Paleontological Resources

- Require a Discovery Plan for any authorized action that would cause disturbance in the Las Vegas Formation; a qualified paleontologist would be on-site during construction activities in case fossils are found.
- Protect the Las Vegas Formation, including the paleontological and geological resources.
- Manage the paleontological assemblages within the Las Vegas Formation.
    - Protect the CTA boundary and in situ fossil localities.
    - Work within BLM's statutes to protect the Las Vegas Formation within all approved Recreation and Public Purposes Act leases.
- Establish appropriate in situ preservation areas for paleontological areas that are kept undisturbed and unfragmented for future research and interpretation.
- Maintain appropriate in situ key paleontological localities that are essential to understanding paleoecology within the Las Vegas Formation.
- Provide mitigation and treatment for all paleontological localities sites that cannot be preserved in situ.
- Conduct regular paleontological prospecting to ensure that new surface fossil sites eroding from the Las Vegas Formation are identified and protected.
- Continue a paleontological stewardship program to educate and train volunteers to monitor and assist in protecting the CTA.

Final mitigation and monitoring measures will be determined during the collaborative development of the Conservation Agreement. Depending on the specific project and types of anticipated disturbances, mitigations may not be appropriate to apply in all cases. The measures identified above and in Appendix

[1] The NRHP lists the site as 980 acres. There has been no change to the boundary; rather, modern technology has allowed the acreage to be calculated with greater accuracy.

B of the Final SEIS will be used to guide the development of the Conservation Agreement, revisions to the Southern Nevada District Resource Management Plan, and individual land use authorizations to provide for long-term protection of sensitive resources within the CTA.

Public Involvement

As defined by CEQ regulations, a cooperating agency is one that has special expertise with respect to an environmental issue and/or has jurisdiction by law. The BLM invited 10 federal, state, and local governments to be cooperating agencies for the preparation of the CTA SEIS. The following agencies accepted the invitation and signed a Memorandum of Understanding with the BLM as cooperating agencies throughout the NEPA process: the U.S. Fish and Wildlife Service, Federal Highway Administration, Las Vegas Paiute Tribe, Clark County, City of Las Vegas, and City of North Las Vegas.

A Notice of Intent (NOI) was published in the *Federal Register* (Vol. 72, No. 129) by the BLM on July 6, 2007, announcing the intent to prepare a SEIS to the LVVDB EIS. The scoping period for the SEIS was July 6, 2007, through September 4, 2007. Three public scoping meetings were held in August 2007.

Public Comment on the Draft SEIS

A 60-day comment period on the Draft SEIS began on January 22, 2010. A Notice of Availability (NOA) was published in the *Federal Register* (Vol. 75, No. 14) by the BLM on January 22, 2010, announcing the availability of the Draft SEIS for public review and comment. The initial close of the comment period was March 22, 2010.

The BLM Las Vegas Field Office hosted three public hearings throughout the LVV on February 22, 23, and 24, 2010, to provide the public with an opportunity to comment on the potential environmental impacts described for the alternatives in the Draft SEIS. Meetings included a brief presentation describing the purpose of and need for determining a final CTA boundary, the alternatives, and the next steps. A court reporter was in attendance to record comments received from members of the public.

The comment period was extended for an additional 60 days for the cooperating agencies and for other interested parties who required additional time to comment. A second NOA was published in the *Federal Register* (Vol. 75, No. 54) by the BLM on March 22, 2010, announcing that the public would have an additional 60 days to provide comments to the BLM on the Draft SEIS. No additional public hearings were scheduled. The comment period closed on May 24, 2010.

Summary of Major Issues

The Cities questioned BLM's goal to manage for natural hydrologic function of the ULVW and why BLM included the alluvial fan north of the ULVW in the CTA boundary, since flood control structures can be built to control erosion from flood events. The BLM's stated goal is to maintain natural processes in the ULVW, not just eliminate erosion. To the extent practicable, BLM wants to maintain a dynamic wash system that requires the input of sheet flow and other run-off from the alluvial fan north of the ULVW to maintain the natural characteristics of its hydrologic condition. Development on this alluvial fan will permanently alter the hydrologic conditions/water resources (surface and ground), watershed function, hydrologic function, and natural function of the wash. In addition, development on this alluvial fan will require the construction of flood control structures, utilities, roads and other infrastructure in the wash. This will directly impact sensitive resources even with mitigation measures in place.

The Cities also questioned the underlying assumptions used in BLM's ULVW hydrologic model and why BLM did not use the Cities' ULVW hydrologic model to analyze water resources. BLM maintains that

the ULVW hydrologic model developed by the Cities, while valid, serves a different purpose than the model developed by BLM. In order to compare one alternative with another, BLM used a modeling approach that focused specifically on the area within the disposal boundary even though the watershed that feeds the ULVW is much larger than that used for analysis. BLM modeled localized flows coming from the Sheep and Las Vegas Ranges north of the ULVW and analyzed the effects of these flows on surface run-off and sedimentation. BLM then compared changes under the various development scenarios to a baseline. The Final SEIS emphasizes that the flows and erosion results are relative to each alternative and not absolute.

In contrast, the Cities' hydrologic model used the entire watershed in modeling approach, which is essential for general in-stream flow volume to determine sizes and needs for flood control structures. However, this approach is not useful for determining flows in small local washes, sheet flows and sedimentation. Changes to a small area are proportionately "smaller" when the modeled area is considerably larger. While both modeling efforts (BLM's and Cities') are valid, the respective models have two entirely different purposes. The modeling effort conducted by the Cities does not address impacts to the resources of concern within the CTA. The BLM recognizes that other alluvial fans in southern Nevada have been developed and have flood control structures in place to control storm waters; however, the alluvial fan north of the ULVW is special for its proximity to unique resources, not just because it is an alluvial fan.

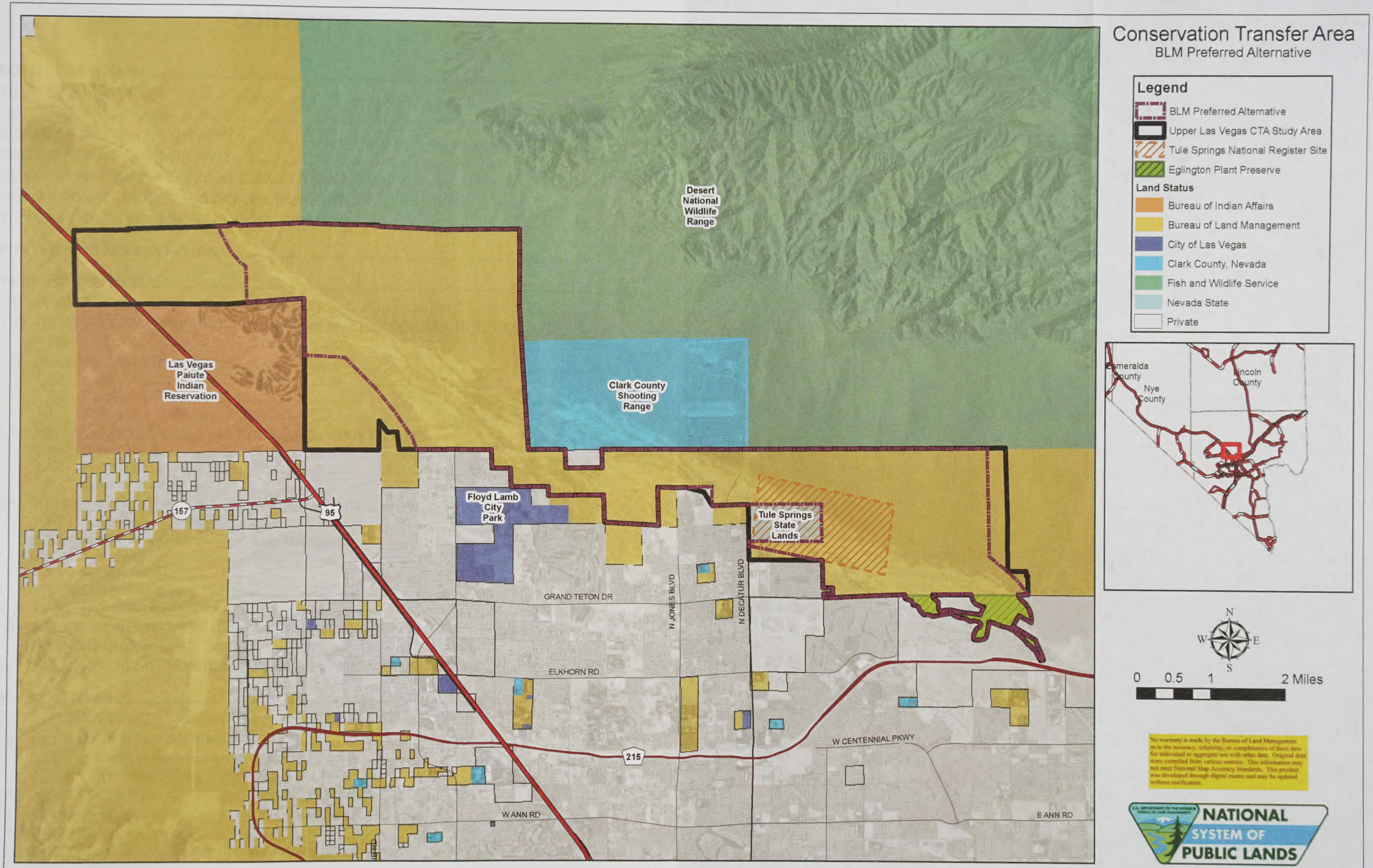
The identification of allowable uses in the CTA was an important issue to the cooperating agencies and other stakeholders. The purpose and need for this SEIS is to set the final boundary for the CTA as identified in the LVVDB FEIS ROD. Identifying allowable uses is outside of the scope of this SEIS and record of decision. Once the boundary is determined through this record of decision, allowable uses in the CTA will be addressed in a subsequent planning effort that will involve all stakeholders. Subsequent planning for this area will include a range of alternatives for allowable uses in the CTA ranging from limited uses to a greater level of uses. Uses may include, but are not limited to, roads, utilities, fences, recreational trails, and other infrastructure.

Appeal Rights

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR Part 4. If an appeal is filed, the following procedures must be followed:

- The Notice of Appeal must be in writing and filed (postmarked) within 30 days of the date of the publication of the U.S. Environmental Protection Agency's Notice of Availability in the *Federal Register*.
- You must fully state your reasons for appealing the decision.
- The Notice of Appeal must be addressed to the Field Manager, with a copy to the Regional Solicitor and the Interior Board of Land Appeal.

The appellant has the burden of showing that the decision appealed is in error. If you wish to file a petition, pursuant to 43 CFR §4.21, for a stay of the effectiveness of the approved ROD pending review of your appeal by the Board, the petition for a stay must accompany your Notice of Appeal. A petition must show sufficient justification based on relative harm, likelihood of success on the merits, immediate irreparable harm if the stay is not granted, and whether the public interest favors granting the stay. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.


Desert National Wildlife Range
Las Vegas Paiute Indian Reservation
Clark County Shooting Range
Floyd Lamb City Park
Tule Springs State Lands
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95
215
GRAND TETON DR
N JONES BLVD
N DECATUR BLVD
ELKHORN RD
W CENTENNIAL PKWY
W ANN RD
E ANN RD
Conservation Transfer Area
BLM Preferred Alternative
Legend
BLM Preferred Alternative
Upper Las Vegas CTA Study Area
Tule Springs National Register Site
Eglington Plant Preserve
Land Status
Bureau of Indian Affairs
Bureau of Land Management
City of Las Vegas
Clark County, Nevada
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NATIONAL SYSTEM OF PUBLIC LANDS

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EXECUTIVE SUMMARY

The Bureau of Land Management Las Vegas Field Office (BLM) has prepared this Final Supplemental Environmental Impact Statement (SEIS) for the Upper Las Vegas Wash (ULVW) Conservation Transfer Area (CTA). The CTA study area is located in the northern portion of the Las Vegas Valley. The BLM has prepared this Final SEIS to assist with the decision for making boundary adjustments to the ULVW CTA referenced in the 2004 *Final Las Vegas Valley Disposal Boundary Environmental Impact Statement* and Record of Decision (LVVBD FEIS/ROD). The final boundary decision was not made in the LVVBD FEIS/ROD. The Final SEIS supplements the analysis contained in the LVVBD FEIS/ROD in order to define a final CTA boundary that ensures protection of sensitive resources, including fossils, cultural resources, and endemic plants, on public lands available for disposal within the CTA study area, as well as to maintain the natural functioning of the wash.

This Final SEIS has been prepared pursuant to the requirements of the National Environmental Policy Act of 1969 and its implementing regulations, issued by the Council on Environmental Quality. The Final SEIS describes the environmental consequences that may result from identifying different final boundaries for the ULVW CTA. This document also presents a record of consultation, coordination, and cooperation with other interested parties during the SEIS preparation. To assist the public and decision makers review, this Final SEIS is organized as follows:

- Chapter 1 discusses the purpose of and need for action.
- Chapter 2 describes the alternative CTA boundaries, including the BLM Preferred Alternative and No-Action Alternative. A discussion of the alternatives considered but eliminated from consideration is also provided in this chapter.
- Chapter 3 provides an overview of the existing environmental conditions within the CTA study area and the potentially affected environment.
- Chapter 4 addresses the potential environmental consequences of implementing the alternatives described in Chapter 2, using the existing baseline conditions presented in Chapter 3. Cumulative impacts and mitigation measures are also discussed in Chapter 4.
- Chapters 5, 6, 7, 8, 9, and 10 present Irreversible and Irretrievable Commitment of Resources, Consultation and Coordination, List of Preparers, Literature Cited, Glossary, and Index, respectively.
- Appendices provide additional technical support data and the response to public comments on the Draft SEIS.

PURPOSE AND NEED

The BLM's need for action to define a final CTA boundary is established by the requirements of the 2004 LVVBD FEIS/ROD, which called for "a process of more study, collaboration, and further NEPA analysis, as needed, and approval of a conservation agreement, if signed, prior to any transfer of title" (BLM 2004b:1). Determination of a final CTA boundary is needed because of the significance of paleontological, botanical, hydrologic, and cultural resources present within the CTA study area. The purposes of the BLM's Proposed Action to determine a final boundary for the CTA are to protect the natural functioning of the ULVW and to protect the sensitive botanical, cultural, and paleontological resources present in the CTA study area.

DECISIONS TO BE MADE

Selection of the final CTA boundary is the first step in the process of protecting sensitive resources in the CTA. Although stakeholders have provided input on a variety of planning and management actions that go beyond defining a final CTA boundary, the BLM is not making a decision on those planning and management actions through this Final SEIS. Additionally, although the LVVBD FEIS/ROD directed the BLM to transfer land in the CTA to another entity pursuant to an approved and signed conservation strategy agreement, the BLM is not making a decision on different managing entities through this process and would continue to manage resources within the final established boundary until such time as an outside entity meets the requirements of a BLM-approved conservation strategy agreement.

SUMMARY OF PUBLIC COMMENTS

More than 750 unique comments were received during the formal comment period on the Draft SEIS. All comments received and the associated BLM responses are provided in Appendix N of this Final SEIS, which can be found on the CD inserted on the back cover or can be obtained as a hard copy from the BLM if requested.

Although comments were received for all resources in the final SEIS, most substantive comments fell into three categories:

1. Alternatives
2. Process
3. Water Resources

Alternatives development and process comments overlap to some degree in that the two issues most frequently raised as requiring resolution in the Final SEIS—1) consistency with the LVVBD FEIS/ROD, and 2) consideration of, and consistency with, state, regional, and local regulations and planning effortswere seen not only as issues requiring the formulation of new alternatives, but also as process inadequacies. Additionally, respondents suggested that the development of alternatives that did not include allowable uses was contrary to the language contained in the LVVDB FEIS/ROD, the authority for development of the Final SEIS.

The Final SEIS is consistent with the LVVDB FEIS/ROD, which called for the further study, collaboration, and analysis of environmental effects of public land disposal within the CTA study area. A range of alternative boundaries, from 1,448 acres up to 12,953 acres, were developed for analysis in the SEIS based on BLM review of the LVVDB FEIS/ROD, the results of the Utah State University report, and all input and recommendations from the cooperators and various stakeholders. The BLM considered a wide range of alternatives boundaries to ensure adequate consideration of the various objectives of stakeholders, which varied from maximum development opportunities to maximum conservation. The final BLM Preferred Alternative CTA boundary has been revised based on the comments received. The new Preferred Alternative boundary is described in more detail below and in Chapter 2 of the Final SEIS.

Although lands in the CTA study area are currently managed by the BLM Las Vegas Field Office and the BLM is not required to conform to local land use plans in its management decisions, the BLM will be consistent with state, regional, and local regulations and planning efforts to the extent that they are consistent with the goals and objectives of the SEIS and with applicable federal regulations, policies, and laws.

During the preparation of the SEIS, the BLM determined that land use allocations can only be determined through the land use planning process. For that reason, no decision on allowable uses in the final CTA boundary is being made through this Final SEIS. The BLM Southern Nevada District is currently updating its Resource Management Plan; land use allocations on BLM-managed lands, including those that would occur in the final CTA boundary, will be determined through that planning process.

Water issues primarily centered on adequacy and accuracy of the hydrologic model, particularly with regard to input data and calculation methodologies.

The hydrology and erosion analysis conducted is comparative in nature and was determined to be appropriate for the intended purpose of evaluating the alternative CTA boundaries and potential impacts to the natural functioning of the ULVW. Reasonable, appropriate and commonly accepted parameters, methods and assumptions were used in the hydrology and erosion analysis. It was determined that a conceptual-level comparative analysis was both sufficient and appropriate to provide a meaningful comparison between all of the alternatives and that any additional detail would not significantly change the relative outcomes of the analysis. The Cities developed and submitted an additional alternative for BLM to analyze that they felt met the needs of resource protection as well as future private development. The BLM determined that the Cities alternative was substantially similar to two other alternatives analyzed in the Draft SEIS and consistent with section 6.6.3 of the BLM NEPA Handbook (BLM 2008a), did not analyze it in the Final SEIS.

In addition to the unique comments received on the Draft SEIS, the Protectors of Tule Springs provided approximately 9,000 signatures to the BLM in support of designating the 13,000 + acres of the CTA study area as part of a National Conservation Area managed by the BLM or as a National Monument. Although the BLM can have management responsibility for National Conservation Areas and National Monuments, the BLM has no authority to make those designations. National Monuments are established through Presidential Proclamation under authority of the Antiquities Act of 1906, or Congress can also designate National Conservation Areas and National Monuments through monument-specific legislation. This alternative was eliminated from further consideration in the Final SEIS because these designations require Presidential and/or Congressional action.

DESCRIPTION OF ALTERNATIVES

From extensive public input, BLM identified six alternative CTA boundaries for analysis, which ranged from maximum development opportunities (1,500-acre No-Action Alternative) to maximum conservation (almost 13,000 acres) to consider the various objectives of stakeholders. These are summarized below in Table ES-1 and described in detail in Chapter 2 of the Final SEIS.

Alternative A, at 12,953 acres, includes the Las Vegas Formation, sensitive cultural and plant resources, the active wash and 100-year floodplain, the adjacent upper alluvial fan, and a 1-mile resource protection zone around northern and eastern boundaries of the Las Vegas Paiute reservation. Alternative A includes the Eglington Preserve but does not include the Tule Springs state lands.

Alternative B, the BLM Preferred Alternative, at 10,495 acres, includes the Las Vegas Formation, sensitive cultural and botanical resources, the active wash and 100-year floodplain, and the adjacent upper alluvial fan. Alternative B includes the Eglington Preserve but does not include the Tule Springs state lands.

Alternative C, at 6,362 acres, includes the fossil formation, sensitive cultural and plant resources, the active wash and 100-year floodplain, and a portion of the adjacent upper alluvial fan. Alternative C includes the Eglington Preserve but does not include the Tule Springs state lands.

Table ES-1. Summary of Alternative Boundaries

Alternative	Alternative Boundary (acres)	Lands outside Alternative Boundary (acres)	Tule Springs (state lands)—outside Alternative Boundary (not available for disposal)	Eglington Preserve—outside Alternative Boundary (not available for disposal)	Lands Available for Disposal (acres)*
Alternative A	12,953	670	299	0	370
Alternative B (Preferred Alternative)	10,495	3,127	299	0	2,827
Alternative C	6,362	7,260	299	0	6,961
Alternative D	5,301	8,321	0	298	8,022
Alternative E	3,314	10,308	0	298	10,010
No-Action Alternative	1,448	12,174	24	0	12,150

* Lands available for disposal = (Total acres outside alternative boundary) – (Eglington Preserve and Tule Springs State Lands if outside the alternative boundary).

Alternative D, at 5,301 acres, includes most of the fossil formation, the sensitive cultural and rare plant resources, and the active wash. Alternative D does not include the Eglington Preserve but does include the Tule Springs state lands.

Alternative E, at 3,314 acres, includes some of the Las Vegas Formation, the sensitive cultural and rare plant resources, and part of the active wash. Alternative E does not include the Eglington Preserve but does include the Tule Springs state lands.

The No-Action Alternative is 1,448 acres and only includes the BLM portion of the Tule Springs National Register Site and the Eglington Preserve. Under the No-Action Alternative, the remaining lands in the CTA study area would be available for disposal, in accordance with the Southern Nevada Public Land Management Act, Federal Land Policy Management Act, other applicable laws subject to valid existing rights, and stipulations established by the conservation strategy agreement.

CHANGES TO THE PREFERRED ALTERNATIVE BOUNDARY

Changes to the Preferred Alternative boundary published in the Draft SEIS were based in part on input from the City of Las Vegas and the Las Vegas Paiute Tribe. Northwest of the Paiute Reservation, the BLM Preferred Alternative CTA boundary has been adjusted to be offset 700 feet from the Las Vegas Formation and run north to the edge of the disposal boundary, providing an additional 512 acres that would be available to the City of Las Vegas for disposal and private development. There are no other changes to the BLM Preferred Alternative boundary. The final BLM Preferred Alternative boundary offers a total of 2,827.5 acres in the CTA study area that would be available for future private development and that would not be subject to the requirements of a BLM-approved Conservation Agreement.

Although the Preferred Alternative boundary has been revised, it continues to provide for the protection of sensitive resources, meeting the BLM's purpose of and need for action. The Preferred Alternative boundary adjustment provides for the natural functioning of the ULVW and would not result in additional impacts to the botanical, cultural, and paleontological resources within the CTA study area.

BLM RATIONALE FOR SELECTING THE PREFERRED ALTERNATIVE

The BLM has selected the revised Alternative B boundary because it best meets the BLM's purpose and need by balancing resource conservation and economic development opportunities. This is achieved by offering 2,827.5 acres to be available for disposal and future private development and by meeting the BLM's purpose for action—to provide for the protection of the natural functioning of the ULVW and the protection of botanical, cultural, and paleontological resources present in the CTA study area. The Preferred Alternative maintains existing stormwater volume, velocity, and depth, along with sediment load, flow location, and flow pattern of stormwater moving down the alluvial fans of the Sheep and Las Vegas ranges without requiring modifications to the wash. The Preferred Alternative protects the Las Vegas Formation and known fossil surface localities, Native American resources, ephemeral wash plant communities, and sensitive plant habitats.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The environmental consequences the alternatives could have on the various natural, socioeconomic, and land use resources are described in the SEIS. The analysis of the different alternatives focuses on identifying types of impacts and their potential significance. The BLM has received input on a variety of new facilities, utilities, roads, and recreation infrastructure by various stakeholders for lands within the study area. The BLM is not making decisions about these actions as part of this process; however, in order to determine the direct and indirect impacts, the BLM has made several assumptions regarding the location and size of potential actions under each alternative. These assumptions are based on detailed information provided by the stakeholders and on different development scenarios that may occur under each alternative. A brief summary of the major conclusions of the analysis is presented in Table ES-2. A detailed analysis of the direct, indirect, and cumulative impacts to these resources from each alternative boundary is presented in Chapter 4 of the Final SEIS.

Table ES-2. Summary of Environmental Impacts

Resource	Impacts	Mitigations
Earth Resources	The primary impact to earth resources would result from hydrologic changes in the ULVW. Increased erosion and sedimentation would occur as a result of increased land uses. Changes in surface erosion are comparative and are based on assumptions described in Chapter 4 of the Final SEIS.	Implementation of standard engineering and construction practices would reduce impacts.
Alternative A	Private development would yield up to 1,340 tons of sediment loss annually as a result of surface erosion and up to 1,030 tons of total stream bank erosion.	Preparation of a Storm Water Pollution Prevention Plan (SWPPP) for construction projects that disturb more than 1 acre is required and would reduce impacts of construction-induced soil erosion and sedimentation.
Alternative B (BLM Preferred Alternative)	Private development would yield up to 1,440 tons of sediment loss annually as a result of surface erosion and up to 1,150 tons of total stream bank erosion.	See above mitigation.
Alternative C	Private development would yield up to 1,630 tons of sediment loss annually as a result of surface erosion and up to 1,380 tons of total stream bank erosion.	See above mitigation.
Alternative D	Private development would yield up to 1,700 tons of sediment loss annually as a result of surface erosion and up to 1,460 tons of total stream bank erosion.	See above mitigation.

Table ES-2. Summary of Environmental Impacts (Continued)

Resource	Impacts	Mitigations
Surface Water/Hydrology	The primary impact to surface water/hydrology would result from increased land uses. Increases in surface water flows and sedimentation would result in changes in the hydrologic and erosive processes in the ULVW and would occur as a result of increased land uses. These changes are compared with baseline conditions described in Section 4.3.1 of the Final SEIS. Additionally, construction of additional flood control facilities and the implementation of any best management practices (BMPs) or mitigation measures for these impacts may conflict with the BLM goals and objectives to protect the natural wash system.	Implementation of standard engineering and construction practices would reduce impacts.
Alternative A	There would be a 2% increase in annual sediment loss from the baseline condition. The hydrologic and erosive processes in the CTA study area would behave in a manner that is similar to existing conditions.	No mitigation measures are identified.
Alternative B (BLM Preferred Alternative)	There would be a 9% increase in annual sediment loss from the baseline condition. Over time, the changing hydrologic and erosive processes in the CTA study area would alter aspects of the natural wash. New private development would be subject to engineering analysis to determine appropriate stability and setback distances from the ULVW.	Preparation of a SWPPP for construction projects that disturb more than 1 acre is required and would reduce impacts of construction-induced soil erosion and sedimentation.
Alternative C	There would be a 23% increase in annual sediment loss from the baseline condition. Over time, the larger flows and greater stream bank erosion resulting from Alternative C would have a greater potential to alter the natural wash. There would be a greater need for additional erosion control measures and additional flood control facilities to protect sensitive areas.	Within their municipal boundaries, the Cities of Las Vegas and North Las Vegas would coordinate with the Clark County Regional Flood Control District to implement flood control measures, as appropriate, to address higher peak flows and erosion within the ULVW. BMPs identified in Appendix A of the Final SEIS may be applied at the design stage for new flood control facilities.
Alternative D	There would be a 29% increase in annual sediment loss from the baseline condition. Over time, the larger flows and greater stream bank erosion resulting from Alternative D would have a greater potential to alter the natural wash. There would be a greater need for additional erosion control measures and additional flood control facilities to protect sensitive areas.	See above mitigation.
Alternative E	There would be a 35% increase in annual sediment loss from the baseline condition. Over time, the larger flows and greater stream bank erosion resulting from Alternative E would have a greater potential to alter the natural wash. There would be a greater need for additional erosion control measures and additional flood control facilities to protect sensitive areas.	See above mitigation.
No-Action Alternative	There would be a 43% increase in annual sediment loss from the baseline condition. Over time, the larger flows and greater stream bank erosion resulting from the No-Action Alternative would have a greater potential to alter the natural wash. There would be a greater need for additional erosion control measures and additional flood control facilities to protect sensitive areas.	See above mitigation.

Table ES-2. Summary of Environmental Impacts (Continued)

Resource	Impacts	Mitigations
Special-Status Plant Species	Increased land uses, including land disposal, would result in the loss of occupied, high-potential, and moderate-potential Las Vegas buckwheat, Las Vegas bearpoppy, and Merriam's bearpoppy habitat.	
Alternative A	Private development on lands outside the Alternative A boundary would result in no loss of Las Vegas Buckwheat habitat. Additionally, there would be a removal of 10.2 acres of moderate potential bearpoppy habitat.	No mitigation measures are identified.
Alternative B (BLM Preferred Alternative)	Private development on lands outside the Alternative B boundary would result in no loss of Las Vegas buckwheat habitat. Additionally, there would be a removal of 5.4 acres of occupied, 266.6 acres of high-potential, and 0.1 acre of moderate-potential bearpoppy habitat.	Measures to reduce or eliminate impacts to special-status plant species include relocating facilities outside habitat, reducing the project footprint to the maximum extent possible, collecting seeds, salvaging topsoil, and propagating and planting native materials. Identify areas that should be avoided for activities or land uses to protect special state plant resources.
Alternative C	Private development on lands outside the Alternative C boundary would result in the removal of 142.1 acres of moderate-potential Las Vegas buckwheat habitat. Additionally, there would be a removal of 7.1 acres of high-potential and 779.7 acres of moderate-potential bearpoppy habitat.	See above mitigation.
Alternative D	Private development on lands outside the Alternative D boundary would result in the removal of 1.3 acres of moderate-potential Las Vegas buckwheat habitat. Additionally, there would be a removal of 3.2 acres of high-potential and 282.7 acres of moderate-potential bearpoppy habitat.	See above mitigation.
Alternative E	Private development on lands outside the Alternative E boundary would result in the removal of 3.1 acres of high-potential and 32.7 acres of moderate-potential Las Vegas buckwheat habitat. Additionally, there would be a removal of 3.2 acres of high-potential and 282.7 acres of moderate-potential bearpoppy habitat.	See above mitigation.
No-Action Alternative	Private development on lands outside the No-Action Alternative boundary would result in the removal of 0.2 acre of occupied, 4.1 acres of high-potential, and 1.6 acres of moderate-potential Las Vegas buckwheat habitat. Additionally, there would be a removal of 39.8 acres of high-potential and 684.9 acres of moderate-potential bearpoppy habitat.	See above mitigation.
Cultural Resources	Increases in land uses would result in increased opportunities for discovery and direct loss of undocumented cultural resources.	Cultural resource mitigation and treatment. Development of public interpretive displays and educational materials would encourage public stewardship and protection of cultural resources.
Alternative A	There would a low probability of vandalism and destruction of undocumented cultural resources from people attracted to CTA as a result of private development on up to 370 acres. Indirect impacts from people attracted to the area would result from increased trail development and educational programs.	See above mitigation.

Table ES-2. Summary of Environmental Impacts (Continued)

Resource	Impacts	Mitigations
Alternative B (BLM Preferred Alternative)	There would a low to moderate probability of vandalism and destruction of undocumented cultural resources from people attracted to the CTA as a result of private development on up to 2,828 acres. Indirect impacts from people attracted to the area would result from increased trail development and educational programs.	See above mitigation.
Alternative C	There would a moderate probability of vandalism and destruction of undocumented cultural resources from people attracted to the CTA as a result of private development on up to 6,961 acres. Indirect impacts from people attracted to the area would result from increased trail development and educational programs.	See above mitigation.
Alternative D	There would a moderate probability of vandalism and destruction of undocumented cultural resources from people attracted to the CTA as a result of private development on up to 8,022 acres. Indirect impacts from people attracted to the area would result from increased trail development and educational programs.	See above mitigation.
Alternative E	There would a moderate probability of vandalism and destruction of undocumented cultural resources from people attracted to the CTA as a result of private development on up to 10,010 acres. Indirect impacts from people attracted to the area would result from increased trail development and educational programs.	See above mitigation.
No-Action Alternative	This has the highest probability of all the alternatives for vandalism and destruction of undocumented cultural resources from people attracted to the CTA as a result of private development on up to 12,150 acres. Indirect impacts from people attracted to the area would result from increased trail development and educational programs.	See above mitigation.
Native American Religious Concerns	Increases in land uses surrounding the ULVW would affect resources of cultural and traditional importance to the Las Vegas Paiute Tribe.	Involving the tribe in planned developments early in the process could reduce impacts.
Alternative A	Alternative A would provide greatest protection of traditional use areas.	No mitigation measures are identified.
Alternative B (BLM Preferred Alternative)	Provides adequate protection of traditional use areas. Development would result in alterations to cultural landscapes.	No mitigation measures are identified.
Alternative C	Development would result in alterations to cultural landscapes.	Involving the tribe in planned developments early in the process could reduce impacts.
Alternative D	Development would result in alterations to cultural landscapes.	See above mitigation.
Alternative E	Development would result in alterations to cultural landscapes.	See above mitigation.
No-Action Alternative	Development would result in alterations to cultural landscapes.	See above mitigation.

Table ES-2. Summary of Environmental Impacts (Continued)

Resource	Impacts	Mitigations
Paleontology	Increases in land uses within the Las Vegas Formation would result in destruction of surface and subsurface paleontological resources as a result of breakage and crushing from surface-disturbing construction activities.	Impacts can be reduced through implementation of a paleontological survey and monitoring program and increasing public awareness.
Alternative A	Alternative A includes all 436 recorded fossil localities. There is the potential for exposure and destruction of undocumented fossil localities in the 370 acres of lands available for disposal.	Collection of all previously recorded scientifically significant surface fossils that will not be preserved or displayed in situ from within the boundaries of the CTA as soon as feasible in order to prevent loss from vandalism, theft, and natural weathering processes. Collection would be housed in a BLM-approved repository (i.e., museum). Mitigation monitoring of all surface-disturbing development activities in order to prevent destruction of scientifically significant subsurface fossils contained within strata of the Las Vegas Formation. Development of in situ paleontological interpretive displays, which may include fossil specimens, and in situ preservation of paleontologically sensitive areas and key fossil localities. Under the direction of the CTA management authority, establishment of an ongoing paleontological survey and monitoring program designed to periodically check for newly exposed fossil remains and monitor the status of in situ preserved localities.
Alternative B (BLM Preferred Alternative)	Alternative B includes all 436 recorded fossil localities. There is the potential for exposure and destruction of undocumented fossil localities in the 2,828 acres of lands available for disposal.	See above mitigation.
Alternative C	Alternative C includes 434 of the 436 recorded fossil localities. There is the potential for exposure and destruction of undocumented fossil localities in the 6,961 acres of lands available for disposal.	See above mitigation.
Alternative D	Alternative D includes 422 of the 436 recorded fossil localities. There is the potential for exposure and destruction of undocumented fossil localities in the 8,022 acres of lands available for disposal.	See above mitigation.
Alternative E	Alternative E includes 318 of the 436 recorded fossil localities. There is the potential for exposure and destruction of undocumented fossil localities in the 10,010 acres of lands available for disposal.	See above mitigation.
No-Action Alternative	The No-Action Alternative includes 82 of the 436 recorded fossil localities. There is the potential for exposure and destruction of undocumented fossil localities in the 12,174 acres of lands available for disposal.	See above mitigation.

Table ES-2. Summary of Environmental Impacts (Continued)

Resource	Impacts	Mitigations
Visual Resources	The transfer of land ownership would not affect visual resources, but the subsequent private development would result in clearly visible changes to the existing landscape.	Measures can be implemented during planning, design, and construction to reduce the presence of proposed facilities and make them more compatible with the natural elements of the landscape.
Alternative A	The level of change to the landscape was determined to be moderate, and proposed development was determined to be consistent with BLM Visual Resource Management objectives.	See above mitigation.
Alternative B (BLM Preferred Alternative)	Private development on 2,828 acres of lands available for disposal would convert predominantly undeveloped landscapes to high-density urban development. Although this is not consistent with Visual Resource Management Class III objectives, private land would not be subject to BLM Visual Resource Management objectives.	See above mitigation.
Alternative C	Private development on 6,961 acres of lands available for disposal would convert predominantly undeveloped landscapes to high-density urban development. Although this is not consistent with Visual Resource Management Class III objectives, private land would not be subject to BLM Visual Resource Management objectives.	See above mitigation.
Alternative D	Private development on 8,022 acres of lands available for disposal would convert predominantly undeveloped landscapes to high-density urban development. Although this is not consistent with Visual Resource Management Class III objectives, private land would not be subject to BLM Visual Resource Management objectives.	See above mitigation.
Alternative E	Private development on 10,010 acres of lands available for disposal would convert predominantly undeveloped landscapes to high-density urban development. Although this is not consistent with Visual Resource Management Class III objectives, private land would not be subject to BLM Visual Resource Management objectives.	See above mitigation.
No-Action Alternative	Private development on 12,150 acres of lands available for disposal would convert predominantly undeveloped landscapes to high-density urban development. Although this is not consistent with Visual Resource Management Class III objectives, private land would not be subject to BLM Visual Resource Management objectives.	See above mitigation.
Land Uses	There would be no impact to current land uses within the CTA study area under any of the alternatives.	No mitigation measures are identified.
Recreation	The primary impact to recreation would result from a loss of open space that is currently available for passive recreation opportunities. Additionally, current access to the CTA study area would be limited as a result of private development on lands available for disposal.	No mitigation measures are identified.
Alternative A	Alternative A would preserve the open space available for non-motorized passive recreation opportunities.	No mitigation measures are identified.
Alternative B (BLM Preferred Alternative)	Alternative B would preserve open space and access available for non-motorized passive recreation opportunities.	No mitigation measures are identified.

Table ES-2. Summary of Environmental Impacts (Continued)

Resource	Impacts	Mitigations
Alternative C	Private development on 6,961 acres of lands available for disposal would reduce the available open space and access to passive recreation opportunities in the CTA study area.	Incorporate plans to establish a non-motorized trail system, compatible with protection of sensitive resources, for the enjoyment of the public in association with private development.
Alternative D	Private development on 8,022 acres of lands available for disposal would reduce the available open space and access to passive recreation opportunities in the CTA study area.	See above mitigation.
Alternative E	Private development on 10,010 acres of lands available for disposal would reduce the available open space and access to passive recreation opportunities in the CTA study area.	See above mitigation.
No-Action Alternative	Private development on 12,150 acres of lands available for disposal would reduce the available open space and access to passive recreation opportunities in the CTA study area.	See above mitigation.
Transportation	The primary impact to transportation resources would be increased traffic resulting from limitations on roadways and population growth associated with the private development of disposal lands in the CTA study area.	
Alternative A	Minor increases in average daily traffic on roads surrounding Alternative A would result from increased visitation for recreation and educational purposes.	No mitigation measures are identified.
Alternative B (BLM Preferred Alternative)	Minor increases in average daily traffic on roads surrounding Alternative B would result from increased visitation for recreation and educational purposes. Additionally, population increases as a result of private development, combined with only minor increases in road capacity assumed under Alternative B, would result in increased traffic volume.	Prior to any private development, builders would consult with the Nevada Department of Transportation and Regional Transportation Commission of Southern Nevada to develop traffic control plans.
Alternative C	Population increases as a result of private development would result in increased traffic volume. The additional road capacity assumed under Alternative C would reduce the effects of increased population.	See above mitigation.
Alternative D	Population increases as a result of private development would result in increased traffic volume. The additional road capacity assumed under Alternative D would reduce the effects of increased population.	See above mitigation.
Alternative E	Population increases as a result of private development would result in increased traffic volume. The additional road capacity assumed under Alternative E would reduce the effects of increased population.	See above mitigation.
No-Action Alternative	Population increases as a result of private development would result in increased traffic volume. The additional road capacity assumed under the No-Action Alternative would reduce the effects of increased population on traffic volume.	See above mitigation.

Table ES-2. Summary of Environmental Impacts (Continued)

Resource	Impacts	Mitigations
Noise	There would be an increase in ambient noise levels associated with development and construction activities that would be associated with potential future development of disposal lands in the CTA study area.	The implementation of engineering and construction practices would reduce impacts to sensitive noise receptors.
Alternative A	There would be no changes in ambient noise levels as a result of Alternative A.	No mitigation measures are identified.
Alternative B (BLM Preferred Alternative)	Private development on 2,828 acres would result in increased ambient noise levels.	BMPs would be implemented to minimize potential impacts to sensitive noise receptors during design and construction of all new potential private development.
Alternative C	Private development on 6,961 acres would result in increased ambient noise levels.	See above mitigation.
Alternative D	Private development on 8,022 acres would result in increased ambient noise levels.	See above mitigation.
Alternative E	Private development on 10,010 acres would result in increased ambient noise levels.	See above mitigation.
No-Action Alternative	Private development on 12,174 acres would result in increased ambient noise levels.	See above mitigation.
Hazardous Materials	Based on the history of mining and unauthorized dumping throughout the CTA study area, there is the potential for discovery of previously unknown hazardous materials on lands available for disposal.	Characterization and appropriate remediation are required in order to ensure that any disposal lands do not include hazardous materials.
Alternative A	There would be an increased risk of discovery on 370 acres as a result of Alternative A.	See above mitigation.
Alternative B (BLM Preferred Alternative)	There would be an increased risk of discovery on 2,828 acres as a result of Alternative B.	See above mitigation.
Alternative C	There would be an increased risk of discovery on 6,961 acres as a result of Alternative C.	See above mitigation.
Alternative D	There would be an increased risk of discovery on 8,022 acres as a result of Alternative D.	See above mitigation.
Alternative E	There would be an increased risk of discovery on 10,010 acres as a result of Alternative E.	See above mitigation.
No-Action Alternative	There would be an increased risk of discovery on 12,174 acres as a result of the No-Action Alternative.	See above mitigation.
Socioeconomics	The preservation or development of currently undeveloped desert lands in the Las Vegas Valley would directly impact the social and economic resources of the area as a result of potential population increases, employment requirements, capital expenditures, loss or gain of open space as an amenity, and loss or gain of productive land value.	No mitigation measures are identified.
Alternative A	The Cities of Las Vegas and North Las Vegas could experience loss of tax revenue and increased costs for transportation and infrastructure if development is farther away and have a reduced ability to grow in a more effective and orderly fashion. There would be direct, beneficial impacts to community resource groups who have an interest in the preservation of the entire CTA study area.	No mitigation measures are identified.

Table ES-2. Summary of Environmental Impacts (Continued)

Resource	Impacts	Mitigations
Alternative B (BLM Preferred Alternative)	Under Alternative B, 2,828 acres would be available for disposal, and there would be a moderate increase in tax revenue over Alternative A. There would be direct, beneficial impacts to community resource groups who have an interest in the preservation of the sensitive resources in the CTA study area.	No mitigation measures are identified.
Alternative C	Under Alternative C, 6,961 acres would be available for disposal and private development and would result in a proportionally larger increase in tax revenue to the cities. Groups who have an interest in preservation of the sensitive resources in the CTA study area would experience impacts to their community's values as a result of more limited protection of these sensitive resources.	No mitigation measures are identified.
Alternative D	Under Alternative D, 8,022 acres would be available for disposal and would result in a proportionally larger increase in tax revenue to the cities. Groups who have an interest in preservation of the sensitive resources in the CTA study area would experience impacts to their community's values as a result of more limited protection of these sensitive resources.	No mitigation measures are identified.
Alternative E	Under Alternative E, 10,010 acres would be available for disposal and would result in a proportionally positive increase in tax revenue to the cities. Groups who have an interest in preservation of the sensitive resources in the CTA study area would experience impacts to their community's values as a result of more limited protection of these sensitive resources.	No mitigation measures are identified.
No-Action Alternative	Under the No-Action Alternative, 12,150 acres would be available for disposal and would result in a proportionally larger increase in tax revenue to the cities. Groups who have an interest in preservation of the sensitive resources in the CTA study area would experience impacts to their community's values as a result of more limited protection of these sensitive resources.	No mitigation measures are identified.

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ACRONYMS AND ABBREVIATIONS

Document Abbreviations

Biological Opinion	*Biological and Conference Opinions for Reinitiation of Consultation on the Las Vegas Valley Programmatic Biological Opinion (File No. 1-5-96-F-023R, as amended) and Previously Reinitiated (File No. 1-5-96-F-023R.2), to Expand the Disposal Boundary (File No, 1-5-96-F-023R3)*
BLM NEPA Handbook	*National Environmental Policy Act Handbook* (H-1790-1)
Conservation Agreement	*Conservation Agreement for the Management of Special Resources on Bureau of Land Management Parcels Nominated for Disposal by the City of North Las Vegas*
Las Vegas RMP	*Proposed Las Vegas Resource Management Plan and Final Environmental Impact Statement*
CCRFCD Master Plan	*Clark County Regional Flood Control District 2002 Master Plan Update*
LVVDB FEIS	*Las Vegas Valley Disposal Boundary Final Environmental Impact Statement*
Mountain Edge Study	*Mountain Edge Parkway Feasibility Study*
MSHCP	*Clark County Multiple Species Habitat Conservation Plan*
Paleontology Plan	*Paleontological Resources Assessment and Treatment Plan—Las Vegas Valley Disposal Boundary EIS, Las Vegas, Nevada*
ROD	*Las Vegas Valley Disposal Boundary Final Environmental Impact Statement Record of Decision*
USU Report	*Upper Las Vegas Wash Conservation Transfer Area: A System to Develop Alternative Scenarios*

Other Abbreviations

ACEC	Area of Critical Environmental Concern
AFY	acre-feet per year
amsl	above mean sea level
AST	aboveground storage tanks
ASTM	American Society for Testing and Materials
BEA	Bureau of Economic Analysis
BIA	Bureau of Indian Affairs
BJS	Bureau of Justice Statistics
BLM	Bureau of Land Management
BMPs	best management practices

CAA	Clean Air Act
CCDCP	Clark County Department of Comprehensive Planning
CCP	Comprehensive Conservation Plan
CCRFCD	Clark County Regional Flood Control District
CCWRD	Clark County Water Reclamation District
CE	critically endangered
Census Bureau	U.S. Census Bureau
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
cfs	cubic feet per second
Clark County Act	Clark County Conservation of Public Land and Natural Resources Act
CTA	Conservation Transfer Area
CWA	Clean Water Act
dB	decibel(s)
DNWR	Desert National Wildlife Refuge
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FINDS	Facility Index System
FLPMA	Federal Land Policy and Management Act
FY	fiscal year
GIS	geographic information system
GPS	global positioning system
Greenways	Greenways, Inc.
GDP	Gross Domestic Product
HEC-1	Hydrologic Engineering Center–1
HEC-RAS	Hydrologic Engineering Center River Analysis System
HMIRS	Hazardous Materials Incident Response System
HPTP	Historic Properties Treatment Plan
HRA	HRA, Inc.
I-CARE	Indian Crime Awareness Research and Evaluation
IC/EC	Federal Institutional and Engineering Controls
ID	identification
IM	instructional memo
KOP	key observation point
LD	land designation

LGN	large-quantity generator
LR2000 database	BLM Legacy Rehost System
LUST	leaking underground storage tank
LVF	Las Vegas Formation
LVFRD	Las Vegas Fire and Rescue Department
LVMPD	Las Vegas Metropolitan Police Department
LVV	Las Vegas Valley
LVVDB	Las Vegas Valley Disposal Boundary
LVVWD	Las Vegas Valley Water District
LVW	Las Vegas Wash
Mgal/day	million gallons per day
NAGPRA	Native American Graves Protection and Repatriation Act
NCA	National Conservation Area
NCDB	National Compliance Database System
NDEP	Nevada Division of Environmental Protection
NDF	Nevada Division of Forestry
NDOT	Nevada Department of Transportation
NEETF	National Environmental Education and Training Foundation
NEPA	National Environmental Policy Act
NFRAP	No Further Remedial Action Planned
NHPA	National Historic Preservation Act
NLVPD	North Las Vegas Police Department
NNHP	Nevada Natural Heritage Program
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	National Park Service
NRA	National Recreation Area
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NSD	Nevada State Demographer
NV Energy	Nevada Energy
NWR	National Wildlife Refuge
OHV	off-highway vehicle
OHWM	ordinary high-water mark
Paiute Reservation	Las Vegas Paiute Indian Reservation
PCB	PolyChlorinated BiPhenol
PFYC	Potential Fossil Yield Classification
PILT	payments in lieu of taxes
PL	Public Law
PZD	Planning and Zoning Department
R&PP Act	Recreation and Public Purposes Act
RCRA	Resource Conservation and Recovery Act
REC	recognized environmental condition
RMI	Rocky Mountain Institute

RMP	Resource Management Plan
ROD	Record of Decision
Roper	Roper Starch Worldwide
ROS	Recreation Opportunity Spectrum
ROW	right-of-way
RTC	Regional Transportation Commission of Southern Nevada
SBCM	San Bernardino County Museum
SEIS	Supplemental Environmental Impact Statement
SGN	small-quantity generator
SHPO	State Historic Preservation Office
SNPLMA	Southern Nevada Public Land Management Act
SNWA	Southern Nevada Water Authority
SWCA	SWCA Environmental Consultants
SWL	Solid Waste Landfill
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traditional Cultural Property
TTI	Texas Transportation Institute
TMDLs	Total Maximum Daily Loads
TRIS	Toxic Release Inventory System
Tule Springs	Tule Springs National Register of Historic Places Site
ULVW	Upper Las Vegas Wash
UNLV	University of Nevada–Las Vegas
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
USU	Utah State University
VCP	Voluntary Remediation or Clean-Up Programs
VGN	conditionally exempt generator
VRM	Visual Resource Management
WUS	waters of the United States
ybp	years before present

Chapter 1

PURPOSE AND NEED

1.1 BACKGROUND

Clark County, Nevada, which encompasses the greater Las Vegas metropolitan area, has been one of the fastest-growing regions in the United States. Between 1996 and 2006, the population increased by almost 800,000. Despite the current economic downturn in southern Nevada, this upward trend is anticipated to resume in the foreseeable future. According to the Nevada State Demographer (NSD 2008), the population of Clark County is projected to increase from 1.95 million in 2007 to 2.53 million by 2017 (about 575,000 people over the 10-year period), and to 3.01 million by 2028 (an additional 485,000 people over the 10-year period).

To address issues associated with the need for developable lands and the management of public lands, Congress passed the Southern Nevada Public Land Management Act (SNPLMA) in 1998 [Public Law (PL) 105-263]. The SNPLMA authorized the United States (U.S.) Department of the Interior Bureau of Land Management (BLM) to dispose of federal lands in Clark County, Nevada, consistent with applicable law, population growth, and community land use plans and policies. In 2002, the Clark County Conservation of Public Land and Natural Resources Act (Clark County Act) [PL 107-282] amended the SNPLMA to expand the disposal boundary area to address the continuing increased growth rates in the Las Vegas region.

The disposal boundary established by the SNPLMA, as amended by the Clark County Act, encompasses much of the Las Vegas Valley (LVV) in southern Clark County, Nevada (Figure 1.1-1). The public lands that became available for auction were primarily located in the northern and southern portions of the disposal area. The northern area encompasses the Upper Las Vegas Wash (ULVW) and is bordered by Nellis Air Force Base to the east, the Desert National Wildlife Refuge (DNWR) to the north, and the Red Rock Canyon National Conservation Area (NCA) and the Las Vegas Paiute Indian Reservation (Paiute Reservation) to the west (Figure 1.1-2).

The BLM Las Vegas Field Office prepared the *Las Vegas Valley Disposal Boundary Final Environmental Impact Statement* (LVVDB FEIS) (BLM 2004a) to identify the environmental consequences that may result from the disposal and use of the remaining BLM-managed lands within the disposal boundary. During preparation of the LVVDB FEIS, sensitive biological, cultural, and paleontological resources were identified along the ULVW within the 5,000-acre Conservation Transfer Area (CTA) in the northern part of the LVV. The *Las Vegas Valley Disposal Boundary Final Environmental Impact Statement Record of Decision* (ROD) for the LVVDB FEIS (ROD No. FES 04-048) selected the Conservation Transfer Alternative, which was analyzed in the LVVDB FEIS as the agency's Preferred Alternative (BLM 2004b).

The Conservation Transfer Alternative allows the BLM to dispose of approximately 46,700 acres of lands in the LVV for future growth of the city and says that the BLM would conduct additional study, collaboration, and environmental analysis of approximately 5,000 acres that have been withheld from sale because of their high concentration of sensitive resources. The ROD indicates the CTA boundary should be adaptable. This Supplemental Environmental Impact Statement (SEIS) is a mandatory step in implementing the decision of the ROD for the LVVDB FEIS, which requires further study, collaboration, and analysis of the environmental effects of public land disposal within the CTA.

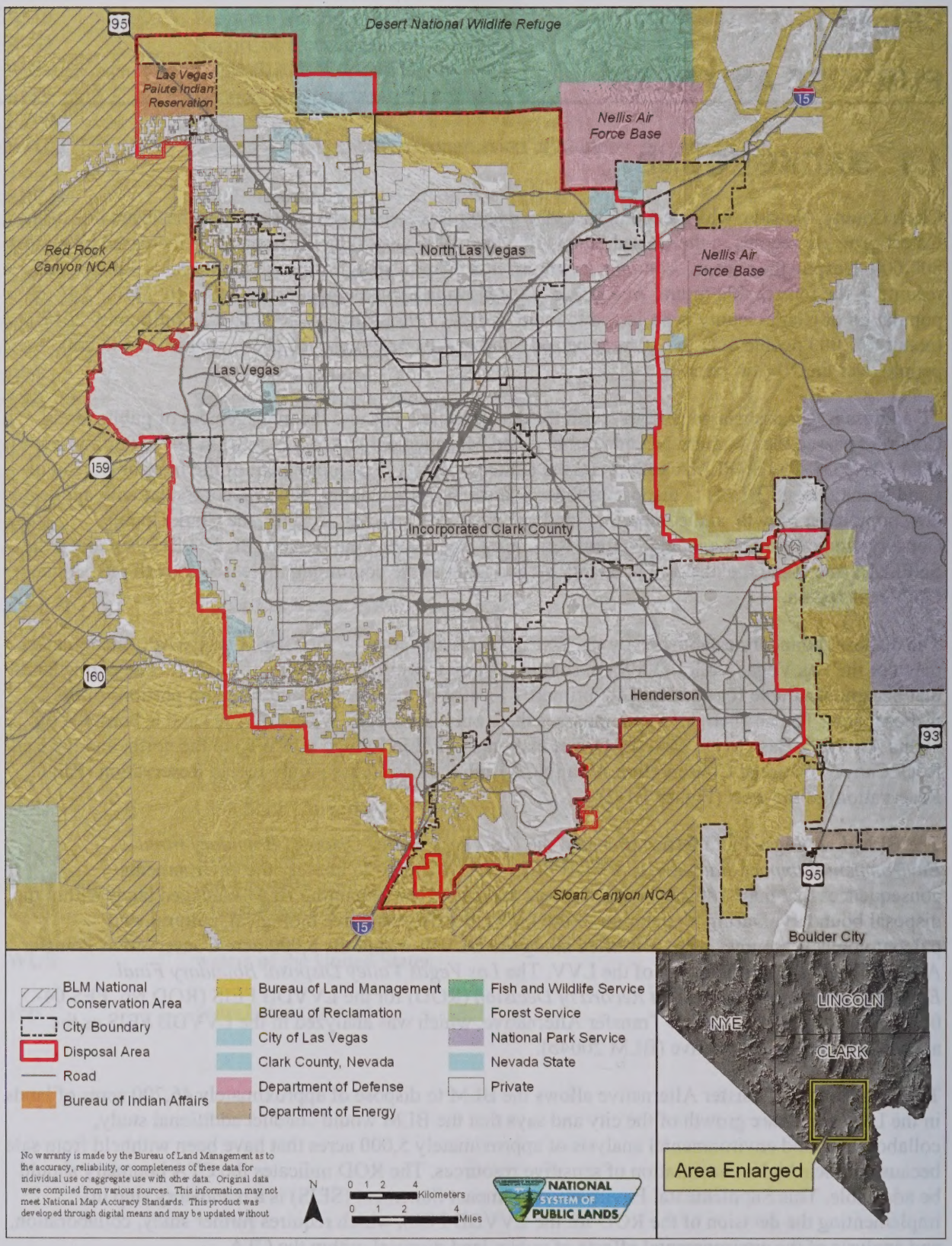
Desert National Wildlife Refuge
Las Vegas Paiute Indian Reservation
Nellis Air Force Base
Red Rock Canyon NCA
North Las Vegas
Nellis Air Force Base
Las Vegas
Incorporated Clark County
Henderson
Sloan Canyon NCA
Boulder City
95
15
159
160
93
BLM National Conservation Area
City Boundary
Disposal Area
Road
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
City of Las Vegas
Clark County, Nevada
Department of Defense
Department of Energy
Fish and Wildlife Service
Forest Service
National Park Service
Nevada State
Private
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without
N
0 1 2 4 Kilometers
0 1 2 4 Miles
NATIONAL SYSTEM OF PUBLIC LANDS
LINCOLN
NYE
CLARK
Area Enlarged

Figure 1.1-1. Bureau of Land Management Las Vegas Valley disposal boundary.

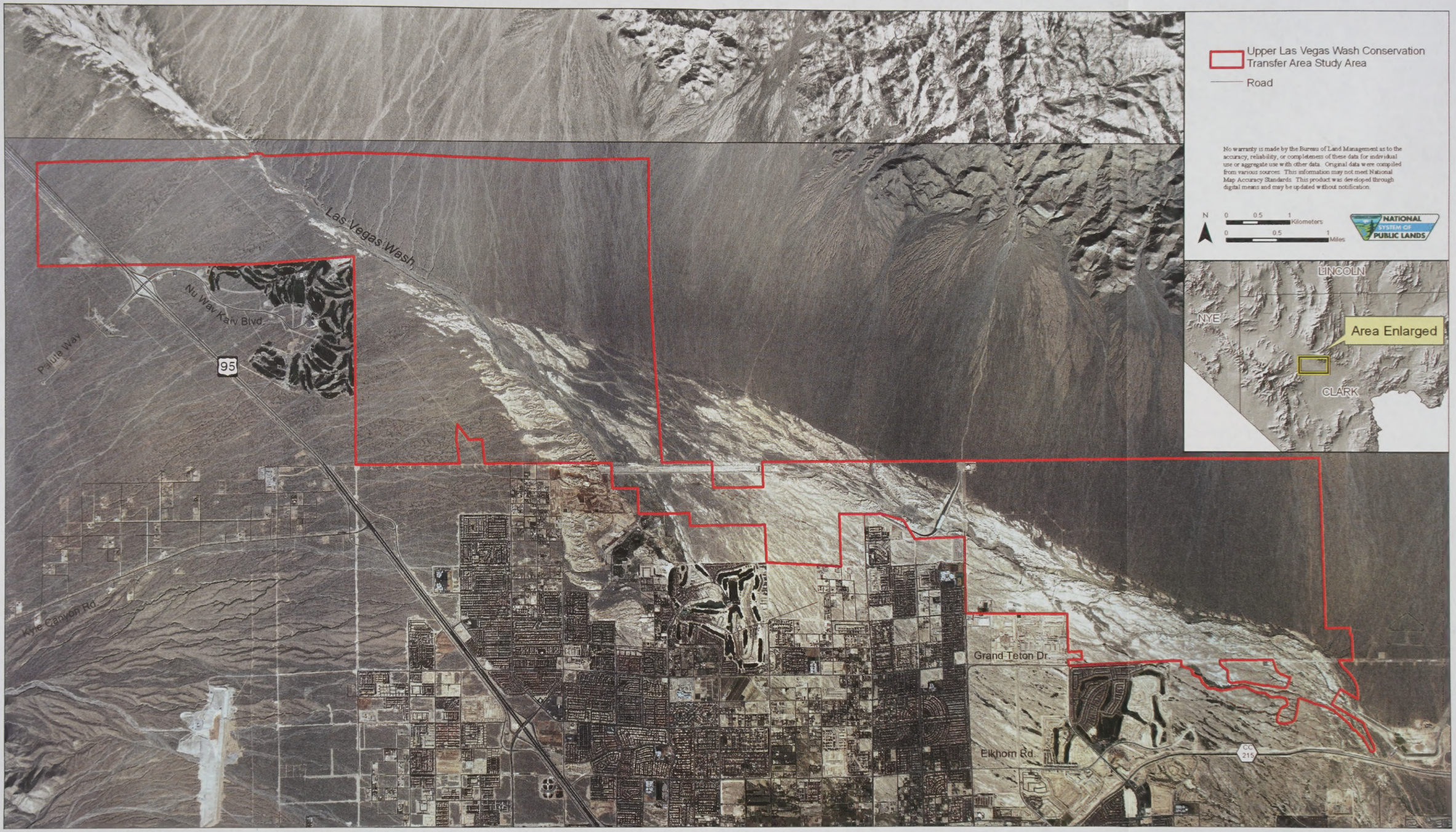
Upper Las Vegas Wash Conservation Transfer Area Study Area
Road
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.
N
0 0.5 1 Kilometers
0 0.5 1 Miles
NATIONAL SYSTEM OF PUBLIC LANDS
LINCOLN
NYE
Area Enlarged
CLARK
Las Vegas Wash
Nu Wav Kaiv Blvd
Paiute Way
95
Kyle Canyon Rd.
Grand Teton Dr.
Elkhorn Rd.
CC 215

Figure 1.1-2. Upper Las Vegas Wash Conservation Transfer Area study area boundary.

Since issuing the ROD in December 2004, the BLM has hosted numerous meetings with stakeholders to gain input regarding the size of the CTA and potential allowable land uses within this area. Additionally, the BLM, with technical assistance from Utah State University (USU), has been conducting numerous studies that, among other things, are designed to specifically identify the locations within the CTA study area that possess the most sensitive resources. Based on preliminary study results, USU personnel prepared a report titled *Upper Las Vegas Wash Conservation Transfer Area: A System to Develop Alternative Scenarios* (USU Report) (USU 2007a).

This CTA SEIS supplements the analysis contained in the LVVDB FEIS. As a result of stakeholder input and internal BLM discussions, the CTA study area to be analyzed in this SEIS has been increased from approximately 5,000 to 13,622 acres. The BLM considered the LVVDB FEIS ROD, the results of the USU Report, and all input and recommendations from the cooperating agencies and the various stakeholders in determining a final CTA study area boundary that would allow consideration of the various objectives of stakeholders, which ranged from maximum development opportunities to maximum conservation.

This SEIS is being prepared by the BLM pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA) [42 United States Code (USC) 4321 *et seq.*], which requires federal agencies to consider environmental consequences in their decision-making process. BLM uses the NEPA process to ensure that its decisions are based on an understanding of potential environmental consequences and alternative courses of action.

To implement NEPA, the Council on Environmental Quality (CEQ) issued regulations [40 Code of Federal Regulations (CFR) 1500–1508] guiding the NEPA process and content of NEPA documents. BLM Handbook H-1790-1, *National Environmental Policy Act Handbook* (BLM NEPA Handbook) (BLM 2008a), provides further instructions for compliance with the CEQ regulations, as well as U.S. Department of the Interior guidance (516 DM 1–7) on NEPA. This SEIS has been prepared in a manner that is consistent with the requirements of the CEQ NEPA regulations and the BLM NEPA Handbook.

The goals of this SEIS are to

- Assist BLM officials in making decisions that are based on an understanding of environmental consequences and in taking actions that protect, restore, and enhance the environment;
- Identify ways in which environmental effects can be avoided or reduced;
- Prevent significant avoidable effects on the environment by implementing alternatives or mitigation measures if feasible;
- Disclose to the public the environmental information and analyses on which the decisions will be based;
- Augment and update existing analyses in the LVVDB FEIS (BLM 2004b);
- Complete site-specific analysis of up to 13,622 acres to allow determination of a final boundary;
- As appropriate, ensure consistency between the SEIS and current and proposed municipal planning documents (e.g., Master Plans) for the area surrounding the CTA; and
- Obtain sufficient data to define a boundary that ensures that the natural functioning of the ULVW, including adjacent alluvial fans, is maintained while allowing for compatible development or uses. Natural functioning is defined as the ability of a system to function and support habitat with little to no anthropogenic alteration or change to that system. In the case of the ULVW, the natural functioning of the wash would include natural flows (both discharge and velocity), natural flood control, sediment transport, erosional processes (deposition and aggradation), and naturally occurring vegetation and habitat.

This SEIS identifies the environmental consequences that may result from the selection of a CTA boundary under each alternative and also identifies methods to avoid, minimize, or mitigate potential impacts, as appropriate. In addition, this document presents a record of consultation, coordination, and cooperation with other interested parties during SEIS preparation.

While the BLM is authorized to dispose of lands within Clark County consistent with applicable laws, population growth, and community land use plans, the conditions of the ROD stipulate that the BLM carefully evaluate the resources within the CTA study area and collaborate with stakeholders to determine an appropriate CTA boundary that is adaptable to the needs and concerns of interested parties.

The LVVDB FEIS provided site-specific analysis for the indirect impacts of the community development scenarios and direct impacts of ROW alignments based on 10-acre parcels of BLM land. These impacts were quantified in the LVVDB FEIS to allow BLM to approve future land use authorizations. Within the final CTA boundary, a conservation strategy agreement will be developed to protect sensitive resources after the ROD is signed. For that reason, no further consideration of specific uses and projects within or adjacent to the CTA study area (e.g., roads, bridges, trails, utility lines, etc.) is being included in this SEIS.

1.2 DESCRIPTION OF THE UPPER LAS VEGAS WASH CONSERVATION TRANSFER AREA

The CTA study area, encompassing 13,622 acres, stretches east from U.S. Highway 95 near the Paiute Reservation to approximately 4 miles west of Interstate 15. The DNWR is directly north of the CTA, and the southern boundary roughly approximates the southern edge of the ULVW. The maximum elevation within the CTA is 3,040 feet above mean sea level (amsl), and the minimum elevation is 2,113 feet amsl.

The CTA study area is located within a broad, northwest-southeast-trending alluvial basin characterized by interbedded alluvial fans originating in the Las Vegas and Sheep ranges and the Spring Mountains. Within the Las Vegas Wash Hydrologic Unit, the Las Vegas Wash (LVW) is a heavily incised natural flood channel that carries stormwater and runoff from Las Vegas to Lake Mead. The LVW not only provides an important floodway in the valley, it also contains unique riparian habitat that supports a large number of plant and animal species. Although sections of the ULVW have been modified through flood control structures (e.g., detention basins), a large portion of the wash provides for natural flood control. Approximately 13 linear miles of the ULVW traverse the CTA study area from the northwest to the southeast.

Three rare plant species occur within the CTA study area: golden bearclaw-poppy (*Arctomecon californica* Torrey and Frémont), commonly referred to as Las Vegas bearpoppy; Merriam's bearpoppy (*Arctomecon merriamii* Coville), also called white bearpoppy; and Nile's wild buckwheat (*Eriogonum corymbosum* Bentham var. *nilesii* Reveal), commonly referred to as Las Vegas buckwheat. All three plant species are listed as special-status species by the BLM. Las Vegas bearpoppy is classified as critically endangered by the State of Nevada, and Las Vegas buckwheat is a candidate for listing under the federal Endangered Species Act (ESA).

The CTA study area and adjacent lands have long been known to contain large numbers of paleontological sites. A 2003 review (conducted in preparation for the LVVDB FEIS) of the Regional Paleontological Locality Inventory revealed 44 known paleontological resource localities. Field surveys of approximately 24,900 acres conducted specifically for the LVVDB FEIS located 438 previously unrecorded paleontological resources within the disposal boundary; the majority of these are located in specific horizons of fossiliferous Quaternary spring deposits in the ULVW (BLM 2004a).

The Tule Springs National Register of Historic Places (NRHP) archaeological site (Tule Springs), is a 1,125-acre designated archeological site[1] that has produced substantial important data relevant to the environmental history of the Great Basin. Approximately 660 acres of the site are located within the CTA study area.

The CTA study area also includes Eglington Preserve, a 300-acre protected area south of Grand Teton Drive between Clayton Street and North 5th Street within the city limits of North Las Vegas. Surrounded by private lands to the south, east, and west, Eglington Preserve is protected through the *Conservation Agreement for the Management of Special Resources on Bureau of Land Management Parcels Nominated for Disposal by the City of North Las Vegas* (Conservation Agreement) (BLM 2005), which obligates BLM, City of North Las Vegas, U.S. Fish and Wildlife Service (USFWS), and Nevada Division of Forestry (NDF). In addition to fossil and special-status plant resources, Eglington Preserve contains the active portion of the ULVW, which terminates into the North Las Vegas detention basin.

While the CTA study area contains ample reserves of potentially salable sand and gravel, under the Clark County Act all lands within the LVVDB have been withdrawn from mineral entry. In addition, no valid existing claims have been identified within the CTA study area boundary.

1.3 PURPOSE AND NEED

BLM's Proposed Action is to establish a final CTA boundary that is compatible with protecting natural, cultural, and biological resources and to facilitate orderly growth within the LVV that is consistent with the LVVDB ROD. The Proposed Action is intended to implement the Las Vegas RMP (BLM 1998a) decisions and management directions, as well as to preserve the intent of the SNPLMA and Clark County Act.

1.3.1 Need

BLM proposes to determine a final boundary for the CTA that meets the scientific requirements to protect sensitive resources. The final boundary for the CTA was not determined in the LVVDB ROD. BLM's Proposed Action is needed to comply with the LVVDB ROD, which provides for an adaptable final CTA boundary based on sound science.

Record of Decision and Adaptable Boundary

The ROD requires further study, collaboration, and analysis of the environmental effects of public land disposal within the CTA study area. Specifically, the ROD states,

> [A]pproximately 5,000 acres will be subject to a process of more study, collaboration, further NEPA analysis, as needed, and approval of a conservation agreement, if signed, prior to any transfer of title. Lands would be nominated under SNPLMA; however, any lands in the CTA would be disposed based on restrictions or mitigation measures determined necessary through the conservation agreement process. It is intended that the boundary of the CTA be adaptable to the needs and concerns of interested parties that participate in the development of the conservation agreement, including community land use planning.

[1] The NRHP lists the site as 980 acres. There has been no change to the boundary; rather, modern technology has allowed the acreage to be calculated with greater accuracy.

1.3.2 Purpose

The purposes of BLM's proposed CTA action are to

- Protect the natural functioning of the ULVW; and
- Protect sensitive botanical, cultural, and paleontological resources in the CTA.

Natural Functioning of Las Vegas Wash

The ultimate boundary of the CTA is critically important to local municipalities that must manage for the growth of their communities. However, because the ULVW is an incised valley floor, it intercepts runoff from adjacent lands that can alter its natural hydrology and water quality. As a result, the ULVW and the resources it contains are subject to impacts caused by land uses both inside and outside its immediate ordinary high-water mark (OHWM). Establishing the CTA boundary is intended to preserve the ULVW's natural hydrologic functioning and water quality.

Botanical, Cultural, and Paleontological Resources

As part of the LVVDB FEIS, field surveys were conducted to identify the presence of sensitive botanical, cultural, and paleontological resources on BLM lands within the disposal boundary area. The survey results indicated that special-status species (including Las Vegas bearpoppy, Merriam's bearpoppy, and Las Vegas buckwheat), cultural resources, and unique paleontological resources within the disposal boundary are predominantly located near the ULVW. BLM's CTA actions are intended to implement BLM's resource protection mandates, derived from the LVVDB FEIS Conservation Transfer Alternative, Las Vegas RMP policies, SNPLMA, Clark County Act, and related federal environmental laws.

Resource Protection Mandate

BLM's mandate to protect sensitive resources in the CTA derives from several sources:

- The LVVDB FEIS Conservation Transfer Alternative, which was the alternative selected in the ROD. Under this alternative, land disposal can occur only with protection of sensitive environmental resources and mitigation of significant impacts to those resources. Lands outside the final CTA boundary would be available for disposal and would not be subject to the terms of the Conservation Agreement. Lands within the final CTA boundary would be disposed of once all parties who are assuming management of the disposed lands sign a Conservation Agreement that stipulates mitigation measures and other restrictions to provide for the long-term protection of sensitive resources within the CTA.
- The Las Vegas RMP, which sets forth numerous policies to protect natural, cultural, and paleontological resources. The Las Vegas RMP requires BLM to protect habitat of Las Vegas bearpoppy (SS-2); protect cultural and paleontological resources in conformance with applicable legislation (CR-1); and limit future impacts to the visual and aesthetic character of public lands in the planning area (VS-1).
- The SNPLMA, which requires the BLM to comply with other laws, including, but not limited to, the Federal Land Policy and Management Act of 1976 (FLPMA), as amended [PL 94-579, 43 USC 1701]; Endangered Species Act of 1973 (ESA), as amended [16 USC 1531–1543]; and National Historic Preservation Act of 1966 (NHPA), as amended [PL 89-665, 16 USC 470 *et seq.*], before any disposal action is approved.

1.3.3 Decision to Be Made

In accordance with the LVVDB ROD, the BLM will make a decision regarding the final boundary of the CTA. Additionally, recommendations regarding best management practices (BMPs) (Appendix A) and mitigations are provided to guide future management within the final CTA boundary.

Selection of the final CTA boundary is the first step in a process for protection of sensitive resources in the CTA. Stakeholder

s have had a key role in determining the alternative boundaries for analysis and in defining goals and objectives for the CTA (Appendix B). Stakeholders have also provided input on a variety of planning and management actions that go beyond defining a final CTA boundary. The BLM is not making a decision on those planning and management actions through this SEIS. However, the information provided by stakeholders is still necessary to support future BLM decisions on specific management of the area. The public input will be used to develop a Conservation Strategy Agreement and associated planning documents, in particular revisions to the *Proposed Las Vegas Resource Management Plan and Final Environmental Impact Statement* (Las Vegas RMP) (BLM 1998a) that were initiated in October 2009. In the RMP revision, the BLM can examine resource allocation for rights-of-way (ROWs), trails, other infrastructure, and protection.

1.4 PRELIMINARY ISSUES, CONCERNS, AND OPPORTUNITIES

The following presents a list of public issues, agency management concerns, and opportunities that were identified prior to and during the public scoping process for this SEIS. Scoping meetings were held from August 14 through 16, 2007, at three different locations near the CTA. A comprehensive discussion of public involvement and the interagency consultation process for this SEIS is presented in Chapter 5, "Consultation and Coordination."

1.4.1 Public Issues

This section summarizes the public issues that were identified through the public scoping process. For a detailed description of all the comments made during the public scoping process, please refer to the *Upper Las Vegas Wash Conservation Transfer Area Supplemental Environmental Impact Statement Scoping Report* (SWCA Environmental Consultants [SWCA] 2007). The issues identified during scoping largely focused on the NEPA process; the purpose of and need for the project; the proposed range of alternatives; specific natural and cultural resources within the CTA study area; and cumulative impacts. Some of the issues brought up during public scoping include the following:

- Protection of paleontological resources in the CTA study area;
- Providing open space and recreational trail connections through the CTA study area;
- Protection of endangered and rare plants, specifically, Las Vegas bearpoppy, Merriam's bearpoppy, and Las Vegas buckwheat;
- Relationship between future development and infrastructure and the final CTA boundary; and
- Relationship between flood control associated with future development and infrastructure in the CTA study area and protection of the natural functioning of the wash.

1.4.2 Agency Management Concerns

The LVVDB FEIS analyzed all BLM-managed lands within the LVV for the resources described in Table 1.4-1. Agency management concerns that were sufficiently analyzed in the LVVDB FEIS and will not be further analyzed in this SEIS include air quality, minerals, wildlife, migratory birds, desert tortoise, environmental justice, public health and safety, water demand, and groundwater resources.

Table 1.4-1. Supplemental Analysis Required

Resource	Supplemental Analysis Required		Rationale
	Yes	No	
Air Quality		✓	Adequate analysis was completed in the LVVDB FEIS.
Geology and Soil	✓		The results of the USU Report are needed to provide necessary scientific information to contribute to the analysis and decision on the final CTA boundary.
Mineral Resources		✓	Adequate analysis was completed in the LVVDB FEIS.
Surface Water/Hydrology	✓		The results of a site-specific hydrology model are required to contribute to a decision on the final CTA boundary.
Groundwater Resources and Water Demand		✓	Adequate analysis was completed in the LVVDB FEIS.
Vegetation	✓		The results of the USU study are needed to provide necessary scientific information to contribute to the analysis and decision on the final CTA boundary.
Special-Status Plant Species	✓		The results of the USU study are needed to consider the effects of different alternative CTA boundaries on populations and habitat of special-status plants, including Las Vegas bearpoppy, Merriam's bearpoppy, and Las Vegas buckwheat.
Wildlife		✓	Adequate analysis was completed in the LVVDB FEIS.
Migratory Birds		✓	Adequate analysis was completed in the LVVDB FEIS.
Threatened and Endangered Species, Desert Tortoise		✓	Adequate analysis was completed in the LVVDB FEIS.
Cultural Resources	✓		Additional studies of the cultural resources in the area are necessary in order to contribute to a decision on the final CTA boundary.
Native American Religious Concerns	✓		Additional tribal coordination related specifically to the ULVW is necessary to complete adequate analysis before making a decision on the final CTA boundary.
Paleontology	✓		The Las Vegas Formation within the CTA study area is considered to be the most significant assemblage of late Pleistocene invertebrate and vertebrate fossil remains known from the Mojave Desert and from the entire Great Basin. The results of the USU Report are needed to provide necessary scientific information to contribute to the analysis and decision on the final CTA boundary.
Visual Resources	✓		Site-specific evaluation of the visual resources in the CTA study area is necessary to consider how each alternative CTA boundary would affect viewsheds within the CTA.
Land Uses	✓		Site-specific analysis of how each alternative CTA boundary would affect future land uses in the CTA study area is necessary.
Recreation	✓		Local communities have expressed a desire for open space and passive recreation access within the CTA study area. Site-specific consideration of existing recreation resources within and adjacent to the CTA study area is necessary.
Transportation	✓		No analysis of transportation issues was completed in the LVVDB FEIS.

Table 1.4-1. Supplemental Analysis Required (Continued)

Resource	Supplemental Analysis Required		Rationale
	Yes	No	
Noise	✓		No analysis of noise impacts was completed in the LVVDB FEIS.
Wastes, Hazardous or Solid	✓		Site-specific analysis of hazardous and solid wastes within the CTA study area is necessary before determining the final CTA boundary.
Socioeconomics	✓		Site-specific analysis of socioeconomic issues is necessary to contribute to a decision on the final CTA boundary.
Environmental Justice		✓	Adequate analysis was completed in the LVVDB FEIS.
Public Health and Safety		✓	Adequate analysis was completed in the LVVDB FEIS.

1.4.3 Opportunities

Certain issues raised by the public and agencies prior to and during the scoping process for this SEIS also present management opportunities that would assist BLM in defining alternative boundaries for the CTA. These opportunities include

- Increased scientific study and inventory of sensitive resources and other resources of interest in and around the CTA;
- Planning for recreational amenities in and around the CTA to serve a large nearby urban population (for example, Floyd Lamb Park and Recreation and Public Purposes Act [R&PP Act] leased lands); and
- Community design charette hosted by the city of Las Vegas on December 6–7, 2007, and the recommendations to the City of Las Vegas for the proposed Upper Las Vegas Development Report prepared by the Rocky Mountain Institute (RMI 2008).

1.5 RELEVANT STATUTES, REGULATIONS, AND GUIDELINES

The following subsections provide a brief description of the laws, regulations, executive orders (EOs), and other guidance that may apply to the establishment of the CTA.

1.5.1 Environmental Policy

NEPA establishes national environmental policy, provides an interdisciplinary framework for federal agency environmental assessment, and contains action-forcing procedures to ensure that federal agency decision-makers take environmental factors into account. NEPA requires preparation of an Environmental Impact Statement (EIS) for major federal actions that significantly affect environmental quality. The EIS discloses to decision-makers and the public the impacts of the Proposed Action and the alternatives to the Proposed Action.

The Executive Order on Protection and Enhancement of Environmental Quality [EO 11514, as amended by EO 11991] establishes the policy for federal agencies to provide leadership in environmental protection and enhancement, in particular implementing NEPA under the guidance of the CEQ.

1.5.2 Land Use and Natural Resources Management

Congress enacted the Southern Nevada Public Land Management Act of 1998, as amended [PL 105-263] to assist BLM management of lands in the rapidly urbanizing Las Vegas region. Specifically, the SNPLMA was intended to resolve issues related to numerous BLM landholdings interspersed among private properties in the Las Vegas metropolitan area, which were thus difficult for BLM to manage, and to allow BLM to dispose of lands for development consistent with community land use plans. The SNPLMA authorizes the BLM to dispose of approximately 52,000 acres of public land located within a specific boundary in the LVV.

Title IV of the Clark County Act [PL 107-282] amended the SNPLMA to increase the disposal boundary area and to include local and regional government entities in the process for receiving funds for the development of parks, trails, and natural areas in Clark County. The changes to the disposal boundary area increased the amount of land available for disposal by approximately 22,000 acres, including the lands in the CTA study area. Subject to valid existing rights, all land designated for disposal was withdrawn from entry and appropriation under the public land laws, location and entry under the mining laws, and operation under the mineral leasing and geothermal leasing laws.

The declaration policy for FLPMA, as amended [43 USC 1701 *et seq.*], requires the BLM to manage public lands to protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values that, where appropriate, will preserve and protect certain public lands in their natural condition, provide food and habitat for fish and wildlife and domestic animals, and provide for outdoor recreation and human occupancy and use.

1.5.3 Biological Resources

BLM Manual 6840, *Special Status Species Management* (BLM 2008b), requires that actions authorized by the BLM further the conservation of federally listed and other special-status species and that the actions do not contribute to the listing of any special-status species.

1.5.4 Water Quality

The Clean Water Act (CWA) of 1972, as amended [33 USC 1251 *et seq.*], establishes a process for states to set water quality standards and develop plans for their achievement. National Pollutant Discharge Elimination System (NPDES) permits set limits on point source discharges to meet state water quality standards. Section 404 of the CWA regulates discharge of dredged or fill materials into waters of the United States (WUS) and adjacent wetlands.

Nevada Water Quality Regulations implement permitting and monitoring requirements for NPDES permits, operation of injection wells, groundwater protection requirements, prevention and response requirements for spills, and salinity standards and criteria for the Colorado River Basin.

The Executive Order on Floodplain Management [EO 11988] requires federal agencies to evaluate the potential effects of actions on floodplains and to consider alternatives to avoid adverse effects and incompatible development wherever possible.

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1.5.5 Cultural Resources

The National Historic Preservation Act of 1966, as amended [16 USC 470 *et seq.*], requires federal agencies to determine the effects of their actions on cultural resources and to take certain steps to ensure these resources are located, identified, evaluated, and protected. Section 106 of the Act requires federal agencies to identify historic or archaeological properties near proposed project sites, including properties listed or eligible for listing in the NRHP. If the Proposed Action has an adverse effect on listed or eligible properties, the agency must consult with the State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation to develop alternatives or mitigation measures. This legislation protects Tule Springs, an archaeological site that has produced substantial important data relevant to the environmental history of the Great Basin.

The Archaeological Resources Protection Act of 1979, as amended [16 USC 470aa–mm], provides for protection of archaeological resources on federal lands. The Act requires permits for the excavation or removal of federally administered archaeological resources and encourages cooperation between federal agencies and private individuals in identifying and protecting important resources. In addition, the Act invokes penalties for excavating, removing, damaging, or defacing any archaeological resources that are more than 100 years old on public or Indian lands.

The American Antiquities Act of 1906 [16 USC 431–433] seeks to protect historic and prehistoric ruins, monuments, and objects of antiquity and scientific interest on lands owned or controlled by the federal government by imposing misdemeanor-level criminal penalties.

The American Indian Religious Freedom Act of 1978, as amended [42 USC 1996], protects and preserves the inherent right of Native Americans to believe, express, and exercise their traditional religions, including their unhindered access to religious sites.

The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) [25 USC 3001 *et seq.*] establishes the right of Indian tribes to claim ownership of certain cultural items, including human remains and funerary, sacred, and cultural patrimony objects and artifacts.

The Executive Order on Protection and Enhancement of the Cultural Environment [EO 11593] directs federal agencies to locate, inventory, nominate, and protect federally owned cultural resources eligible for the NRHP and to ensure that their plans and programs contribute to preservation and enhancement of non–federally owned resources.

The Executive Order on Indian Sacred Sites [EO 13007] directs federal agencies to accommodate access to and ceremonial use of Indian sacred sites and avoid adversely affecting the physical integrity of sacred sites.

The Executive Order on Consultation and Coordination with Indian Tribal Governments [EO 13175] directs federal agencies to establish regular and meaningful consultation and collaboration with tribal officials on federal actions that have tribal implications.

1.5.6 Hazardous Materials

The American Society for Testing and Materials (ASTM) Standard E 1527-05 and Section 120(h) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) [42 USC 9601 *et seq.*] provide guidelines for conducting investigations and providing notice regarding the presence of hazardous substances on federal lands prior to the sale or transfer of such federal lands.

1.6 RELATIONSHIP TO BUREAU OF LAND MANAGEMENT POLICIES, PLANS, AND PROGRAMS

The Proposed Action in this SEIS is consistent with decisions in the LVVDB FEIS and the Conservation Transfer Alternative, which was identified as the Preferred Alternative in the ROD (BLM 2004b). In addition, the Proposed Action is in conformance with management objectives and directions of the Las Vegas RMP (BLM 1998a), SNPLMA, and the Clark County Act for land disposal, ROW management, and recreation management. Public lands within the disposal boundary area are available for disposal or authorized use through sale, exchange, R&PP Act lease, or permit in accordance with the FLPMA, as specified in the Las Vegas RMP under management objective Land Disposal-1 (LD). The Proposed Action will also conform to management direction LD-2-a: "Land use lease or permit applications, and airport lease applications will be addressed on a case-by-case basis, where consistent with other resource management objectives and local land uses. Special terms and conditions regarding use of the public lands involved will be developed as applicable" (BLM 1998a).

The Proposed Action will be consistent with the following Las Vegas RMP requirements. As specified in SS-2, BLM will manage habitat to sustain populations of federally listed species so that they no longer need protection under the ESA and will manage habitats to support non-listed species so that future listing is not necessary. As specified in SS-2-a, BLM will protect the habitat of Las Vegas bearpoppy. BLM will protect cultural and paleontological resources in conformance with applicable legislation and BLM policy as specified in objective CR-1.

BLM policy and the *Clark County Multiple Species Habitat Conservation Plan* (MSHCP) (Clark County Department of Comprehensive Planning [CCDCP] and USFWS 2000) require that BLM ensure no unmitigated net loss of Las Vegas bearpoppy habitat. BLM cannot undertake actions that will lead to the listing of a species under the ESA. In addition, the *Biological and Conference Opinions for Reinitiation of Consultation on the Las Vegas Valley Programmatic Biological Opinion (File No. 1-5-96-F-023R, as amended) and Previously Reinitiated (File No. 1-5-96-F-023R.2), to Expand the Disposal Boundary (File No. 1-5-96-F-023R3)* (Biological Opinion) (USFWS 2004) states that BLM must ensure that Las Vegas buckwheat within the LVV is managed in order to preclude protection under the ESA. The final CTA boundary will be consistent with these requirements by ensuring sustainable Las Vegas bearpoppy and buckwheat populations and habitat.

1.7 RELATIONSHIP TO NON-BLM POLICIES, PLANS, AND PROGRAMS

The proposed actions in this SEIS will be consistent with other officially approved federal, state, and local plans, policies, and programs to the extent that they are consistent with the goals and objectives of the SEIS and with applicable federal regulations, policies, and laws. The following documents as they relate to the CTA have been reviewed and considered as the SEIS has been developed.

- USFWS. 2008. *Draft Comprehensive Conservation Plan: Desert National Wildlife Refuge Complex*. USFWS Southern Nevada Field Office.
- City of Las Vegas. 2007. *Floyd Lamb Park Master Plan.*
- CCDCP and USFWS. 2000. *Clark County Multiple Species Habitat Conservation Plan.*
- Nevada Senate Bill 40. 1983. Nevada Statewide Policy Plan for Public Lands.

- Clark County Regional Flood Control District (CCRFCD). 2004. *Clark County Regional Flood Control District 2002 Master Plan Update.*
- City of Las Vegas. 2006. *City of Las Vegas Master Plan 2020.*
- City of North Las Vegas. 2006. *City of North Las Vegas Comprehensive Master Plan.*
- Clark County. 2001. *Clark County Comprehensive Master Plan.*

Chapter 2

ALTERNATIVES

2.1 INTRODUCTION

NEPA requires that an EIS consider a reasonable range of alternatives to the Proposed Action, including a No-Action Alternative. Reasonable alternatives are those that meet the purpose and need and are feasible to implement, given technical, economic, environmental, and other factors. NEPA also requires that the No-Action Alternative be evaluated to provide a baseline for comparison of the impacts of other alternatives, even if a No-Action Alternative may not be implemented as a result of legal, regulatory, or other considerations, including a legislative command to act.

NEPA requires that an EIS rigorously explore and objectively evaluate all reasonable alternatives. This comparative analysis of alternatives gives decision-makers and the public information that sharply defines the issues and provides a clear basis for choosing an alternative [40 CFR 1502.14].

This chapter contains descriptions of each of the alternatives for the CTA that are evaluated in this SEIS, as well as the process used to develop the alternatives. This chapter also contains summaries of the alternatives that were initially considered but subsequently eliminated from detailed analysis.

2.2 DEVELOPMENT OF ALTERNATIVES

The BLM Las Vegas Field Office hosted 10 public meetings during a 10-month period in 2005 to give the public opportunities to provide input for the CTA identified in the LVVDB FEIS (BLM 2004a). During those meetings, BLM received input on a variety of topics, including vision statements, goals and objectives, boundaries, infrastructure, recreation, education, and management options. Additionally, potential alternatives, based on professional judgment of USU investigators, were obtained from the USU Report (USU 2007a). Information from the USU Report and from other studies and documents was gathered to determine what components of the alternatives would be considered.

The BLM reviewed the LVVDB FEIS ROD, the results of the USU Report, and all input and recommendations from the cooperating agencies and the various stakeholders in determining a final CTA study area boundary that would allow consideration of the various objectives of stakeholders, which ranged from maximum development opportunities to maximum conservation. Boundary recommendations for the CTA ranged from approximately 3,300 to almost 13,000 acres.

Based on the SNPLMA (as amended), LVVDB FEIS, USU Report, public input, and local BLM staff resource expertise, preliminary alternatives were developed for presentation at public scoping meetings held in Las Vegas on August 14 through 16, 2007. Comments and recommendations received during those meetings, the public scoping comment period (July 6, 2007–September 4, 2007) for the CTA SEIS, and at an urban planning workshop hosted by the City of Las Vegas in December 2007 were considered in formulating the alternatives presented in this SEIS. In addition, the resource knowledge of local BLM staff aided in further refining the alternatives.

2.2.1 Factors Considered in Developing the Alternatives

Reasonable alternatives must meet the purposes for action described in Chapter 1, which are to

- Protect the natural functioning of the ULVW; and
- Protect sensitive natural, cultural, and paleontological resources in the CTA.

Reasonable alternatives must also meet the needs for the project, which are to

- Comply with the LVVDB FEIS ROD, which provides for an adaptable final CTA boundary; and
- Respond to BLM's mandate to protect sensitive natural, cultural, and paleontological resources.

The following sections describe resource values and uses present in the CTA that may be affected by disposal and development as authorized by the SNPLMA and Clark County Act. These resource values and uses guided development of the alternatives described in Sections 2.3 through 2.5 below.

For detailed information on the resource values and current uses of the CTA, see Chapter 3, "Affected Environment." For a more thorough discussion of the nature of the issues, concerns, and opportunities identified for resolution through the SEIS process, see Chapter 1, "Purpose and Need."

Hydrology

BACKGROUND

The ULVW is the headwaters for the LVW, which serves as the main drainage channel for the LVV and its tributaries. The ULVW, located within the CTA boundary, drains approximately 500 square miles and conveys stormwater runoff from the mountains and alluvial fans generally north and northwest of the city of North Las Vegas, ultimately flowing into Lake Mead. The ULVW is a normally dry, very wide, sand-bed channel that is highly susceptible to erosion, headcutting, braiding, and lateral migration resulting from infrequent but intense cloudburst rainfall events, steep topography, and increased urbanization. The ULVW supports a variety of vegetation and provides access to outdoor activities. It has also been identified as important to Native American traditional uses. Erosional processes in the wash have exposed cultural and paleontological resources.

Land development in the watershed of the ULVW can alter the land surface and result in runoff and higher peak flows that affect the natural functioning of the wash. Urban runoff and higher sediment loads can result in higher levels of contaminants both in the watershed and downstream. Sensitive resource values associated with the ULVW can be affected, including riparian and other plant species such as catclaw acacia and mesquite, cultural resource sites, and fossil sites. Maintenance of adjacent open space, however, can help reduce these potential effects.

FACTOR

Consider how each alternative CTA boundary would affect the hydrologic functioning of the wash, the resource values found in proximity to the wash, and management of stormwater runoff.

Floyd Lamb Park at Tule Springs

BACKGROUND

Floyd Lamb Park, immediately southwest of the CTA, encompasses a total of 2,040 acres. The 680-acre park core (formerly known as Floyd Lamb State Park) is centered on Tule Springs, a series of small springs that historically formed an oasis in the middle of the Mojave Desert. The buildings of Tule

Springs Ranch are listed in the NRHP, and the site is used by Las Vegas residents as an urban retreat. The remainder of the park includes 1,361 acres of lands leased from BLM under the R&PP Act. The park contains some of the best Pleistocene-era paleontological resources in western North America (San Bernardino County Museum [SBCM] 2004). In July 2007, the park, R&PP Act leases, and water rights were transferred from the Nevada Division of State Parks to the City of Las Vegas.

Proposed development of permanent recreation facilities (e.g., city park, trailheads, parking areas) within Floyd Lamb Park can result in the loss of the cultural and paleontological resources. While development can be mitigated by collecting physical remains and information from sites, surface disturbance can result in the permanent loss of the resources and their context with other elements of the site and surrounding environment. Active management of the park can provide protection of the cultural and paleontological resources present within the park.

FACTOR

Consider how each alternative CTA boundary would affect recreational opportunities, cultural resources, and paleontological resources at Floyd Lamb Park.

Paleontological Resources

BACKGROUND

The Pleistocene-age Las Vegas Formation (LVF) within the CTA is known to be highly fossiliferous and is considered to be the most significant assemblage of late Pleistocene invertebrate and vertebrate fossil remains known from the Mojave Desert and from the entire Great Basin (SBCM 2004). More than 430 fossil localities have been recorded within the CTA by paleontologists from the SBCM, and thousands of fossils have been excavated, prepared, curated, and interpreted. This work has contributed to a more complete, detailed understanding of the stratigraphy and paleoecology of the LVF. LVF fossils include a diverse assemblage of terrestrial and aquatic mollusks, amphibians, numerous species of birds, and small and large mammals. Representative fossils include ground sloth (*Nothrotheriops shastensis*), North American lion (*Panthera atrox*), camel (*Camelops* sp.), horse (*Equus* sp.), bison (*Bison* sp.), and mammoth (*Mammuthus columbi*). Many of these resources are found in Tule Springs, a 1,125-acre designated archeological site that has produced substantial important data relevant to the paleoenvironmental history of the Great Basin.

FACTOR

Consider how each alternative CTA boundary would affect paleontological resources in the CTA.

Eglington Preserve

BACKGROUND

Eglington Preserve is a 300-acre parcel of public land that is managed to protect two special-status plants—Las Vegas bearpoppy and Las Vegas buckwheat. Eglington Preserve is located south of Grand Teton Drive between Clayton Street and North 5th Street, within the city limits of North Las Vegas. Bordered by private lands to the west, south, and east, Eglington Preserve is protected through a Conservation Agreement between the BLM, USFWS, NDF, and City of North Las Vegas. The Conservation Agreement identifies allowable uses within and surrounding Eglington Preserve. In addition to special-status plants, Eglington Preserve contains fossils and the active portion of the ULVW, which terminates into the North Las Vegas detention basin. Not all the alternative boundaries include Eglington Preserve.

Eglington Preserve is the site of a newly approved, fee-based compensatory mitigation bank, under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act regulatory programs. Under the restoration plan, titled *Protection, Restoration, and Enhancement Plan for the Project Area within Eglington Preserve* (BLM 2007b), as approved by the U.S. Army Corps of Engineers (USACE), 143 acres of ephemeral washes were identified for improvement and protection through Section 404 of the CWA permit fees.

Land development can result in fragmentation of habitat or disturbance and mortality of plants. Mitigation such as collection, transplanting, and/or seed bank salvage can reduce these impacts. Cooperative management of areas like Eglington Preserve can preserve viable populations of special-status plants, maintain the range of the species, protect sources of seed for expansion of the species to other areas of their range, and protect the functioning of wash systems.

FACTOR

Consider how each alternative CTA boundary and management of Eglington Preserve would affect populations of Las Vegas bearpoppy and Las Vegas buckwheat, as well as the functioning of the wash system.

Special-Status Species

BACKGROUND

Special-status plants and wildlife are known to occur in the CTA, including one BLM sensitive plant species (Merriam's bearpoppy), one State of Nevada protected plant species (Las Vegas bearpoppy), and one candidate for federal listing and proposed for State of Nevada protection (Las Vegas buckwheat). The rare plant species are regional endemics that are limited to specialized habitats in the northern Mojave Desert ecosystem. The LVV contains a substantial proportion of extant populations of Las Vegas bearpoppy and Las Vegas buckwheat, and it contains potentially genetically unique populations of all three special-status plant species.

Conversion and fragmentation of habitat resulting from land development in the LVV has led to rapid declines in the number and distribution of special-status species. USFWS and NDF have stated that further loss of individuals and populations would be detrimental to the long-term viability of Las Vegas bearpoppy and Las Vegas buckwheat and would potentially lead to emergency listing under the ESA (BLM 2004a). Preservation of occupied and suitable habitats within the CTA can serve to eliminate or minimize impacts to these plants and avoid their being listed by the USFWS (USFWS 2004), as well as protecting suitable habitat for other special-status species.

FACTOR

Consider how each alternative CTA boundary would affect populations and habitat of special-status plants, including Las Vegas bearpoppy, Merriam's bearpoppy, and Las Vegas buckwheat.

Recreation

BACKGROUND

Recreation opportunities in the CTA are casual and dispersed and include hiking, camping, picnicking, mountain biking, horseback riding, climbing, sightseeing, and off-highway vehicle (OHV) use. There are no developed recreation sites on public lands in the CTA. The Las Vegas RMP (BLM 1998a) limited OHV use in the CTA to existing roads, trails, and dry washes. In November 1998, BLM issued a valley-

wide closure to off-highway travel, as the LVV did not meet air quality standards under the Clean Air Act (CAA). Thus, the Las Vegas RMP places recreation emphasis in the CTA on non-motorized forms of recreation.

The Floyd Lamb Park Core, adjacent to the CTA, is managed by the City of Las Vegas for picnicking, hiking, biking, horseback riding, and fishing. The park includes 1,361 acres of public land that overlaps the CTA under two R&PP Act leases. Portions of the Las Vegas Valley Trail System cross the CTA.

Local communities have expressed a desire for open space and passive recreation access (City of Las Vegas 2004). The City of Las Vegas is preparing an open space plan and has identified its two most critical concerns for open space: to preserve natural areas and viewsheds and to provide habitat for wildlife and plants. The community's desire for open space can be at least partly met in the CTA.

FACTOR

Consider how each alternative CTA boundary would affect recreation use of the CTA.

Visual Resources

BACKGROUND

The landscape of the CTA is characterized by the floodplain of the ULVW and the adjacent alluvium, deposited from the Spring Mountains to the west and the Sheep and Las Vegas ranges and Gass Peak to the north. Vegetation is typical of low elevations of the Mojave Desert and includes creosote bush shrub, desert saltbush shrub, and desert wash shrub vegetation communities. Whereas the landscape is largely unmodified by human development, roads, power lines, and flood control structures (wash channelization and retention basins) have altered parts of the CTA.

FACTOR

Consider how each alternative CTA boundary would affect viewsheds within the CTA and user experiences. Consider how visual resource management (VRM) objectives would complement and support the management objectives for other resources within the CTA.

Las Vegas and North Las Vegas Infrastructure and Growth

BACKGROUND

Lands west of Decatur Boulevard in the CTA are within the incorporated limits of the City of Las Vegas, and lands east of Decatur Boulevard in the CTA are within the incorporated limits of the City of North Las Vegas. As these cities continue to grow, their need for infrastructure continues to grow.

The cities have expressed concerns regarding how their needs for infrastructure and development will be met.

FACTOR

Consider how each alternative CTA boundary would affect the growth and economic prosperity of the Cities of Las Vegas and North Las Vegas.

Las Vegas Paiute Indian Reservation

BACKGROUND

The Paiute Reservation is adjacent to the CTA in the northwestern part of the disposal area. The Las Vegas Paiute Tribe has noted that the ULVW has been used for countless generations as a trade and migration route as part of the larger Salt Song Trail system and is spiritually significant to the Tribe. The LVW represents an important traditional landscape and potential Traditional Cultural Property (TCP) for the Las Vegas Paiute Tribe and other tribal communities in the areas, including the Chemehuevi and Moapa Paiute.

The Las Vegas Paiute Tribe requested a buffer on the north and east sides of their reservation from potential future urban development and that the reservation be provided protection from visual and social disturbances associated with adjacent residential areas and transportation networks. The Tribe has also expressed concern for protection of the economic benefits of its golf resort, which may be diminished by nearby development and the loss or obstruction of views of the native desert and the Spring Mountains. Recently, the Las Vegas Paiute Tribe and the City of Las Vegas have been working closely together on planning issues.

FACTOR

Consider how each alternative CTA boundary would affect the Las Vegas Paiute Tribe and its reservation as well as tribal cultural resources within the CTA.

Recreation and Public Purposes Act Leased Lands and Rights-of-Way

BACKGROUND

The R&PP Act authorizes the sale and lease of public lands for recreational or public purposes to state and local governments, federal and state instrumentalities, and nonprofit organizations. Currently, three authorized leases, a pending lease, and a pending ROW overlap the CTA. Two of the authorized leases are to the City of Las Vegas for the development of recreation facilities. Lease N-62830 comprises 320 acres, and lease N-36876-01 encompasses 1,041 acres. Preliminary plans for these R&PP Act leases are addressed in *Floyd Lamb Park Master Plan* (City of Las Vegas 2007a) and include conceptual trails for hiking and equestrian use and other forms of passive recreation. These leased lands connect the northwestern and southeastern portions of the ULVW in the CTA and maintain continuity for ecological and recreational functions.

The City of North Las Vegas's McCool Regional Park, lease N-49747-01, comprises 160 acres of public lands within the CTA. A portion of the park includes 40 acres of Tule Springs. The park includes sports fields, picnic areas, trails, a model airplane flying area, and a xeriscape demonstration garden. The leased lands connect existing residential areas south of the CTA to Tule Springs within the CTA.

The two pending actions for a ROW and an R&PP Act lease within the CTA are proposed for a water detention basin and additional regional park developments. Pending ROW N-37233 comprises 640 acres west of the Clark County Shooting Park and includes plans for development of a water detention basin of up to 1,773 acre-feet. Pending lease N-78462-01 requests 80 acres west of Decatur Boulevard for a detention basin and development of park-related facilities, such as picnic shelters, restrooms, parking, and recreational trails. There are 11 additional pending ROW actions, listed in Table 3.8-2 and shown in Figure 3.8-1 of the SEIS.

FACTOR

Consider how each alternative CTA boundary would affect management of lands under R&PP Act leases and ROWs within the CTA, both currently authorized and pending.

Clark County Shooting Park

BACKGROUND

A shooting park was created by the Conveyance of Property to Clark County, Nevada Act of 2002 [(PL 107-350) 116 Statute 2975 *et seq.*], in response to the closure of recreational shooting in the LVV. The shooting park comprises approximately 2,800 acres north of Moccasin Road, adjacent to both the DNWR and CTA. A portion of the ULVW crosses the southwestern portion of the shooting park. Clark County has prepared a master plan for the shooting park that describes the type and location of the various facilities to be developed on 900 acres of the 2,800-acre conveyance. Construction of the public facilities began in May 2008. The shooting park will offer a safe place for citizens to participate in recreational shooting in a controlled environment. The first phase of development for the shooting park will include a day use range, hunter education area, trap and skeet field, archery range, and other support facilities. Clark County intends to focus intensive shooting park infrastructure development outside the ULVW.

FACTOR

Consider how each alternative CTA boundary would affect operation of the shooting range.

Desert National Wildlife Refuge

BACKGROUND

The DNWR encompasses 1.5 million acres north of the CTA and is managed by the USFWS. About one-half of the refuge is jointly managed with the U.S. Air Force as part of the Nevada Test and Training Range. The USFWS is in the process of preparing a Comprehensive Conservation Plan (CCP) and EIS for the entire Desert National Wildlife Refuge Complex (DNWR is one of four refuges in the complex) in compliance with the National Wildlife Refuge System Improvement Act of 1997 and NEPA. As part of the CCP/EIS effort, the USFWS is evaluating several alternatives for management of the DNWR. These alternatives consist of various objectives and strategies that are derived from the refuge's primary goals. Refuge goals address managing bighorn sheep populations, maintaining natural diversity, managing specially designated areas, improving visitor services, and managing cultural resources. A key aspect of managing the DNWR is ensuring compatibility with surrounding land uses.

FACTOR

Consider how each alternative CTA boundary would affect the ecological, wildlife, recreation, and cultural resource management objectives of the DNWR. Consider how management of the refuge would affect land uses in the adjacent CTA.

Southern Nevada Public Lands Management Act of 1998 and Clark County Conservation of Public Land and Natural Resources Act of 2002

BACKGROUND

Congress enacted the SNPLMA to address concerns over federal management of lands in the rapidly urbanizing Las Vegas metropolitan area. The purpose of the SNPLMA is to provide for the disposal of certain federal lands in Clark County, Nevada, and to provide for the acquisition of environmentally sensitive lands in the state of Nevada. The law authorized BLM to dispose of approximately 52,000 acres of public lands located within the disposal area of the LVV in accordance with other applicable laws. Title IV of the Clark County Act amended the SNPLMA to increase the disposal boundary area and to include regional governmental entities in the process for receiving funds for the development of parks, trails, and natural areas in Clark County. The Clark County Act increased the lands available for disposal by about 22,000 acres, including lands in the CTA.

SNPLMA land sales a joint selection process, the BLM must concur with the nomination of land for sale. Typically, local governments nominate parcels of federal land for disposal from within the disposal boundary. Generally, nominations are made in response to interest from potential buyers. Once an interest is expressed, the local government follows a joint selection process to ensure that the parcel is not needed for a public purpose. Nominations are then submitted to BLM one year in advance of the proposed sale date. BLM reviews each nominated parcel to verify ownership, existing rights, and pending applications or reservations and prepares an Environmental Site Assessment for each parcel before moving forward with the sale.

FACTOR

Consider how each alternative CTA boundary would meet the Congressional policies and the intent of the SNPLMA and Clark County Act.

2.2.2 Components of Each Alternative

Each alternative was developed to implement the requirements of the ROD for the LVVDB FEIS. This includes boundary definitions. Each alternative involves the transfer of title of BLM lands to public or private entities. Each alternative boundary leaves different amounts of land outside the CTA boundary available for disposal and future subsequent development consistent with SNPLMA, which provides for the disposal of public lands in accordance with other applicable laws.

Boundary

The final boundary will be important for protection of sensitive resources, as well as for local governments that must plan for the growth of their communities. Although the ROD for the LVVDB FEIS identified approximately 5,000 acres of land to be withheld from disposal, it also stipulated that the boundaries were adaptable to the needs and concerns of interested parties participating in the development of the Conservation Agreement (BLM 2005). As the result of input during public meetings in 2005 and 2006 and its own internal analysis, the BLM has expanded the CTA study area to 13,622 acres. Alternatives considered in this SEIS range in size from 1,448 to 12,952 acres. Each alternative described below is compared in size with the original CTA, defined as 5,000 acres, in the LVVDB FEIS and ROD (BLM 2004a).

Conservation Agreement

Based on the direction approved in the LVVDB FEIS ROD (BLM 2004b), BLM would dispose of lands within the CTA once all parties who are assuming management of the disposed lands sign a Conservation Agreement. As noted above, this Conservation Agreement would stipulate mitigation measures and other restrictions to provide for long-term protection of sensitive resources within the disposed lands.

Specific conservation measures would be defined through a collaborative process involving BLM and members of the Mitigation Strategy Committee, which includes USFWS, NDF, Clark County Department of Air Quality and Environmental Management, Nevada Division of State Parks, and other federal, state, and regional agencies; the Las Vegas Paiute Indian Tribe; local governments; elected officials; environmental or other special interest organizations; and utility companies and other businesses (BLM 2004a).

2.3 ACTIONS COMMON TO ALL ACTION ALTERNATIVES

All the action alternatives include the following management actions:

- BLM has developed and would implement a treatment plan for eligible cultural sites within the CTA in compliance with the NHPA, except for Tule Springs, which is already protected.
- Conservation measures would be put in place for the protection of surface paleontological sites and sensitive plant habitats.
- BLM would inventory unauthorized surface disturbances in the CTA, including illegal dump sites, user-created trails and tracks, and other trespasses, and would seek to rehabilitate these disturbances to a more natural condition to improve management and protection of sensitive resources.
- Any future infrastructure would be authorized on a case-by-case basis, would incorporate BMPs identified by the BLM and the Nevada State Conservation Commission (1994), and would be subject to site-specific NEPA analysis.
- The authorized R&PP Act leases with the City of Las Vegas for Floyd Lamb Park (N-36876-01 and N-62830) would continue to be managed under a BLM-approved plan of development.

2.4 ALTERNATIVES CONSIDERED FOR DETAILED ANALYSIS

Six alternatives were considered in order to adequately analyze a range of boundaries while continuing to meet the purpose of and need for the CTA. These boundaries were identified through agency and public scoping.

Each of these alternatives considered the original CTA boundary of 5,000 acres and either added or subtracted acreage from that boundary to meet the objectives of the alternative as well as the overriding purpose of and need for the CTA (see Chapter 1, Section 1.3). The LVVDB EIS allowed for the final CTA boundary to be modified in size and shape from its original designation and stated that a separate NEPA analysis must be completed to determine the final CTA boundary. Table 2.4-1 provides a comparison of the original CTA boundary, as defined in the LVVDB EIS, with the SEIS alternatives outlined above, while Table 2.4-2 shows a detailed comparison of the alternatives with the 13,662.7-acre CTA study area.

Table 2.4-1. Comparison of Original CTA Boundary with SEIS Alternatives

Alternative	Alternative Boundary (acres)	Original CTA Boundary (acres)	Change in Acres between Original CTA and Alternative	% Change between Original CTA and Alternative
Alternative A	12,952.5	5,000.0	7,952.5	159% increase
Alternative B (Preferred Alternative)	10,495.6	5,000.0	5,495.6	109% increase
Alternative C	6,362.3	5,000.0	1,362.3	27% increase
Alternative D*	5,301.4	5,000.0	301.4	6% increase
Alternative E	3,313.8	5,000.0	−1,686.2	34% decrease
No-Action Alternative	1,448.2	5,000.0	−3,551.8	71% decrease

* Alternative D represents the original CTA boundary as subsequently adjusted to correct for acreage discrepancies in the LVVDB FEIS and reflect greater accuracy in acreage calculation.

Table 2.4-2. Comparison of SEIS Alternatives

Alternative	Alternative Boundary (acres)	Lands outside Alternative Boundary (acres)	Tule Springs (state lands)—outside Alternative Boundary (not available for disposal)	Eglington Preserve—outside Alternative Boundary (not available for disposal)	Lands Available for Disposal (acres)*
Alternative A	12,952.5	670.2	299.4	0.0	370.8
Alternative B (Preferred Alternative)	10,495.6	3,127.1	299.4	0.0	2,827.5
Alternative C	6,362.3	7,260.4	299.4	0.0	6,961.0
Alternative D	5,301.4	8,321.3	0.0	298.6	8,022.7
Alternative E	3,313.8	10,308.9	0.0	298.6	10,010.3
No-Action Alternative	1,448.2	12,174.5	24.5	0.0	12,150.0

* Lands available for disposal = (Total acres outside alternative boundary) – (Eglington Preserve and Tule Springs if outside the alternative boundary).

2.4.1 Alternative A

Alternative A (Figure 2.4-1) emphasizes preservation of the sensitive resources located within the CTA and ensures the natural functioning of the ULVW.

Alternative A is the alternative with the largest boundary and provides the greatest amount of protection for the functioning of the wash, habitat for special-status species, and paleontological resources. Alternative A provides the most protection to the DNWR and provides the Paiute Reservation with the most protection from encroachment. This alternative has the most connectivity to traditional and tribal resources within the wash.

Under Alternative A, the CTA would comprise 12,952.5 acres (see Figure 2.4-1); this alternative extends the boundary to the DNWR to the north and 1 mile north and east around the Paiute Reservation in order to maintain the natural character of the landscape and setting. The area designated as Eglington Preserve would be included in the CTA. Alternative A adds 7,952.5 acres to the original CTA boundary. Under this alternative, 370.8 acres within the CTA study area would remain available for private development purposes. Alternative A would include within the CTA 3,200 acres surrounding the Paiute Reservation that would not be available for private development.

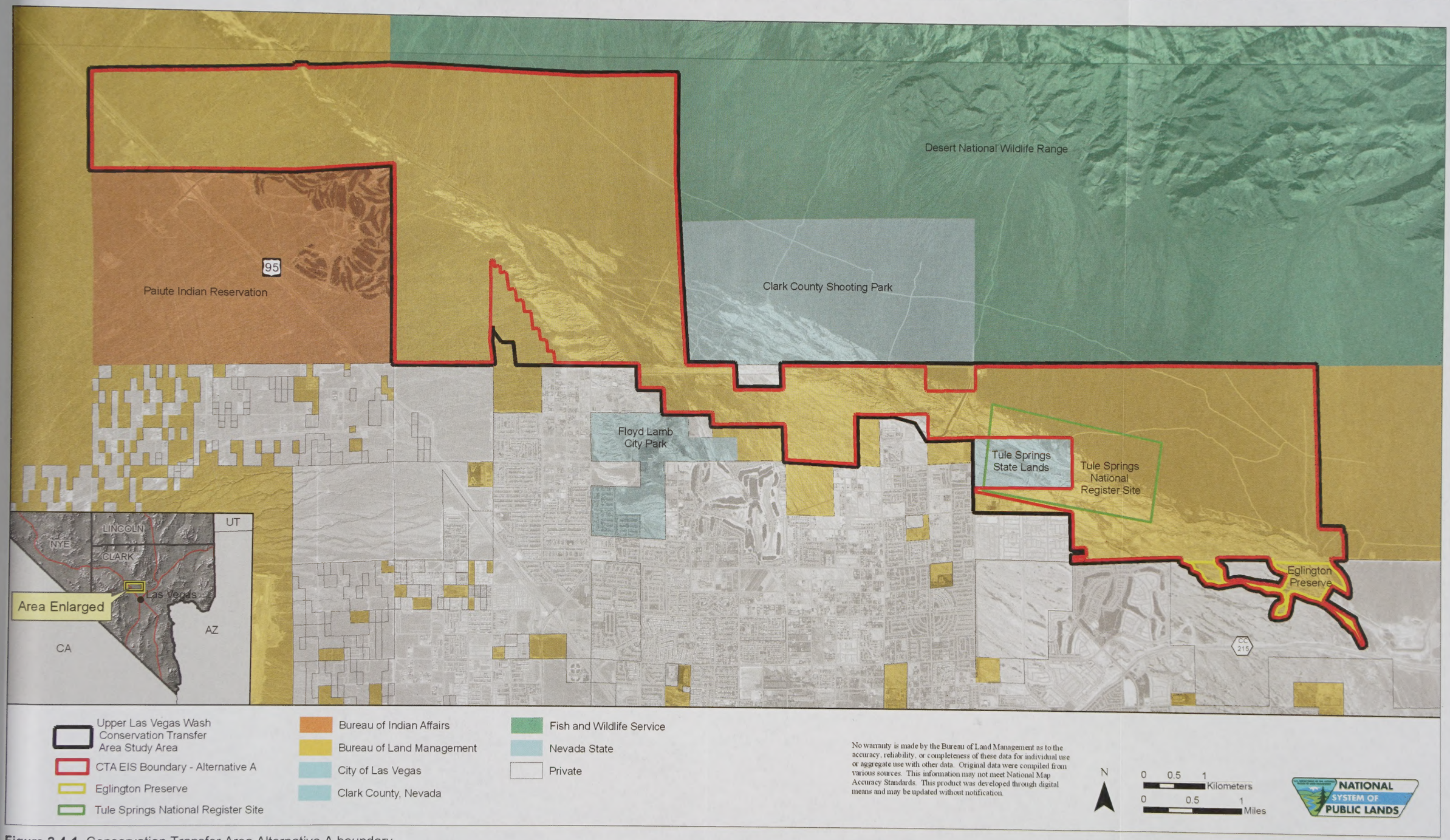

Figure 2.4-1. Conservation Transfer Area Alternative A boundary.

2.4.2 Alternative B (BLM Preferred Alternative)

Based on public comments received on the Draft SEIS and a review of the analysis, Alternative B, which is the BLM Preferred Alternative, has been revised from the Draft SEIS to exclude 512 acres of land north of the Paiute Reservation. Alternative B now comprises 10,495.6 acres, 512 acres less than the Draft SEIS Alternative B (Figure 2.4-2).

Changes to the Preferred Alternative boundary published in the Draft SEIS were based in part on input from the City of Las Vegas, the Las Vegas Paiute Tribe, and information from an urban planning workshop hosted by the City of Las Vegas in December 2007 (RMI 2008). The Preferred Alternative boundary would provide for a reasonable distance between the fossil formations and any future urban development outside the boundary. Alternative B encompasses most of the upper alluvial fans in the CTA study area and stretches north to the boundary of the DNWR (see Figure 2.4-2). The eastern boundary would be offset 1,200 feet from the edge of the CTA study area, leaving approximately 373.1 acres available to the City of North Las Vegas for private development. East of the Paiute Reservation, the southern boundary of Alternative B would be offset 700 feet from the LVF. Northwest of the Paiute Reservation, the northern boundary has been adjusted to be offset 700 feet from the LVF and run north to the edge of the disposal boundary, leaving a total of 2,454.6 acres available to the City of Las Vegas for disposal and subsequent private development. Within the CTA study area, a total of 2,827.5 acres would be available for disposal and private development. The revised Alternative B boundary continues to provide for the protection of the natural functioning of the ULVW and other sensitive resources while allowing for an additional 512 acres of lands for disposal and private development. Alternative B would maintain existing stormwater volume, velocity, and depth, along with sediment load, flow location, and flow pattern of stormwater moving down the alluvial fans of the Sheep and Las Vegas ranges. Alternative B protects the LVF, Native American resources within the wash, ephemeral wash plant communities, and sensitive plant habitats. Lands designated as the Eglington Preserve would be included in Alternative B.

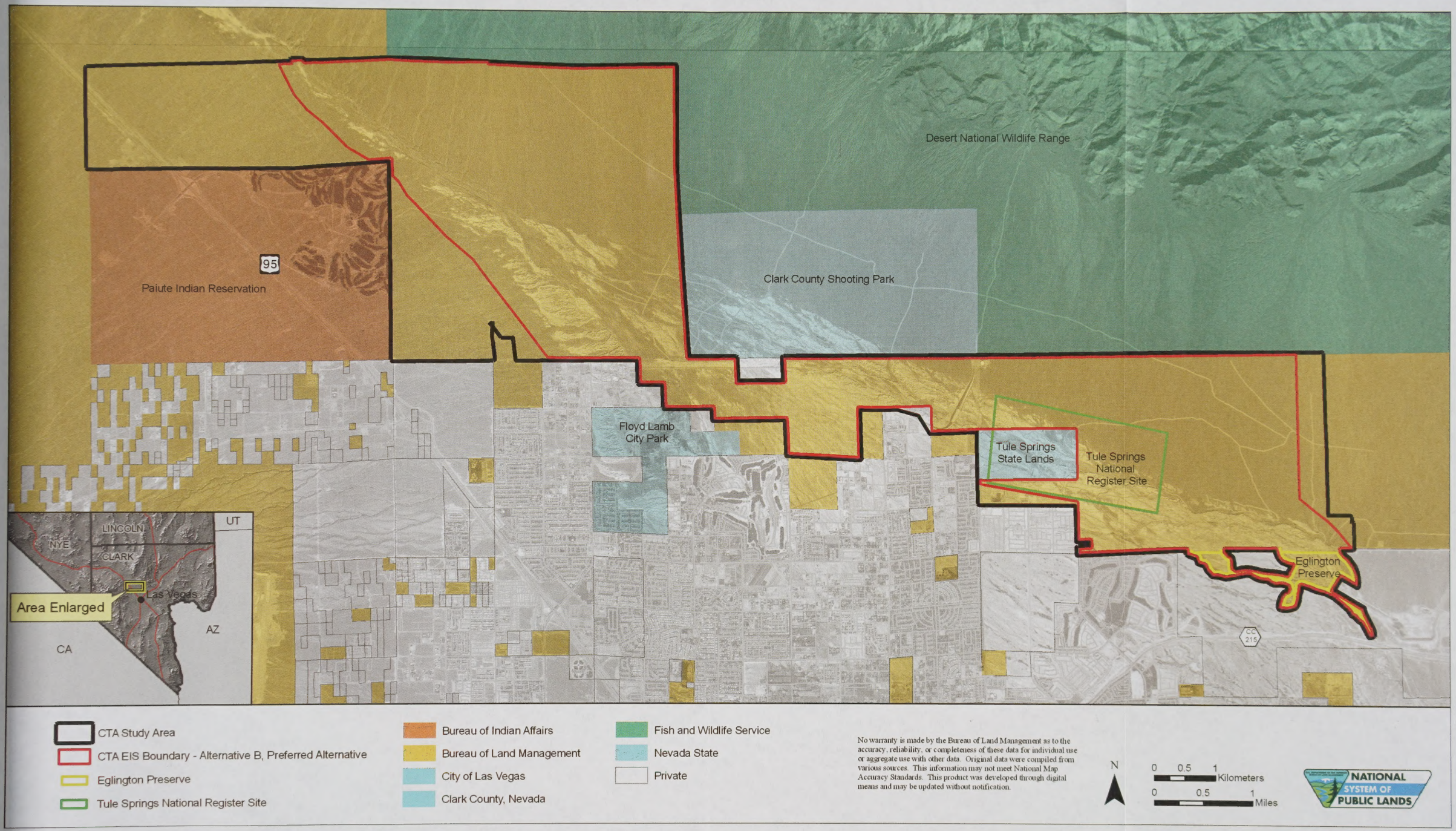

Figure 2.4-2. Conservation Transfer Area Alternative B, Preferred Alternative boundary.

2.4.3 Alternative C

Alternative C (Figure 2.4-3) continues to meet the resource conservation purposes for paleontological resources and special-status plants and incorporates the 100-year floodplain. Alternative C adds 1,362.3 acres to the original CTA boundary. Alternative C includes lands surrounding the northwest corner of the Paiute Reservation that would not be available for private development. Lands designated as Eglington Preserve would be included in the CTA.

Under Alternative C, the CTA would comprise 6,362.3 acres (see Figure 2.4-3); 6,961.0 acres within the CTA study area would remain available for disposal. Alternative C includes a portion of the upper alluvial fans in the CTA study area but does not extend to the boundary of the DNWR. The northeastern boundary would leave approximately 2,063 acres available to the City of North Las Vegas for development. East of the Paiute Reservation, the southern boundary of Alternative C, combined with the area north of the wash, would leave a total of 4,898 acres available to the City of Las Vegas for development. Within the CTA study area, a total of 6,961 acres would be available for disposal. The Alternative C boundary does not allow waters flowing down the alluvial fans of the Sheep and Las Vegas ranges to continue in their current condition.

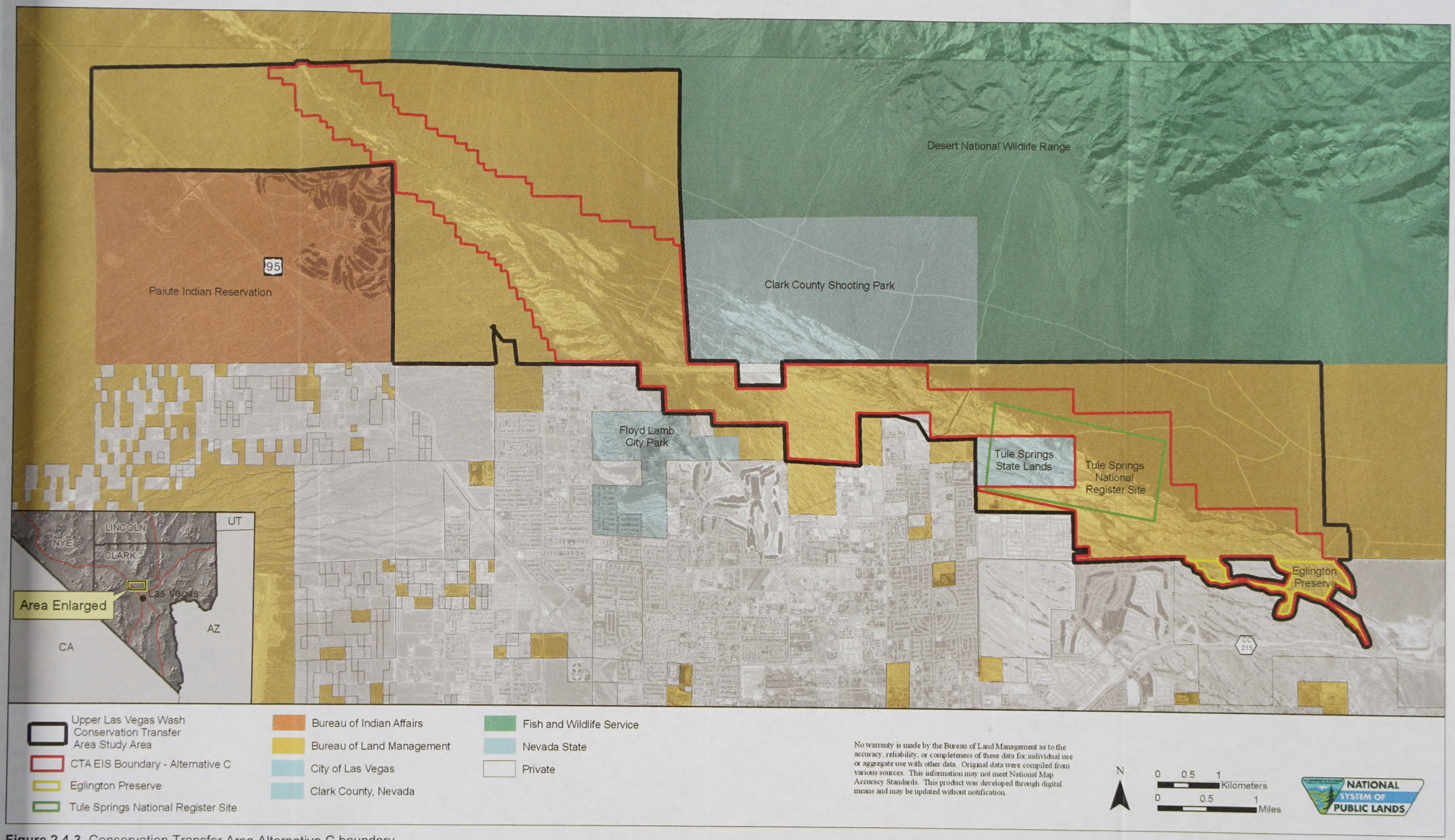

Figure 2.4-3. Conservation Transfer Area Alternative C boundary.

2.4.4 Alternative D

Alternative D (Figure 2.4-4) protects the surface paleontological localities identified in the LVVDB FEIS, special-status plant habitat outside Eglington Preserve, and the active wash channel. Alternative D adds 301.4 acres to the original CTA boundary. Lands around the Paiute Reservation would be available for private development.

Under Alternative D, the CTA would comprise 5,301.4 acres. Under this alternative, 8,022.7 acres of the CTA study area would remain available for disposal (see Figure 2.4-4); Alternative D includes active portions of the wash. The upper alluvial fans north of the wash would be available for disposal. The northeastern boundary would leave 1,980 acres available to the City of North Las Vegas for development. The southern boundary of Alternative D, combined with the area north of the Paiute Reservation and the wash, would leave a total of 6,043 acres available to the City of Las Vegas for development. Within the CTA study area, a total of 8,023 acres would be available for disposal. The Alternative D boundary does not allow waters flowing down the alluvial fans of the Sheep and Las Vegas ranges to continue in their current condition.

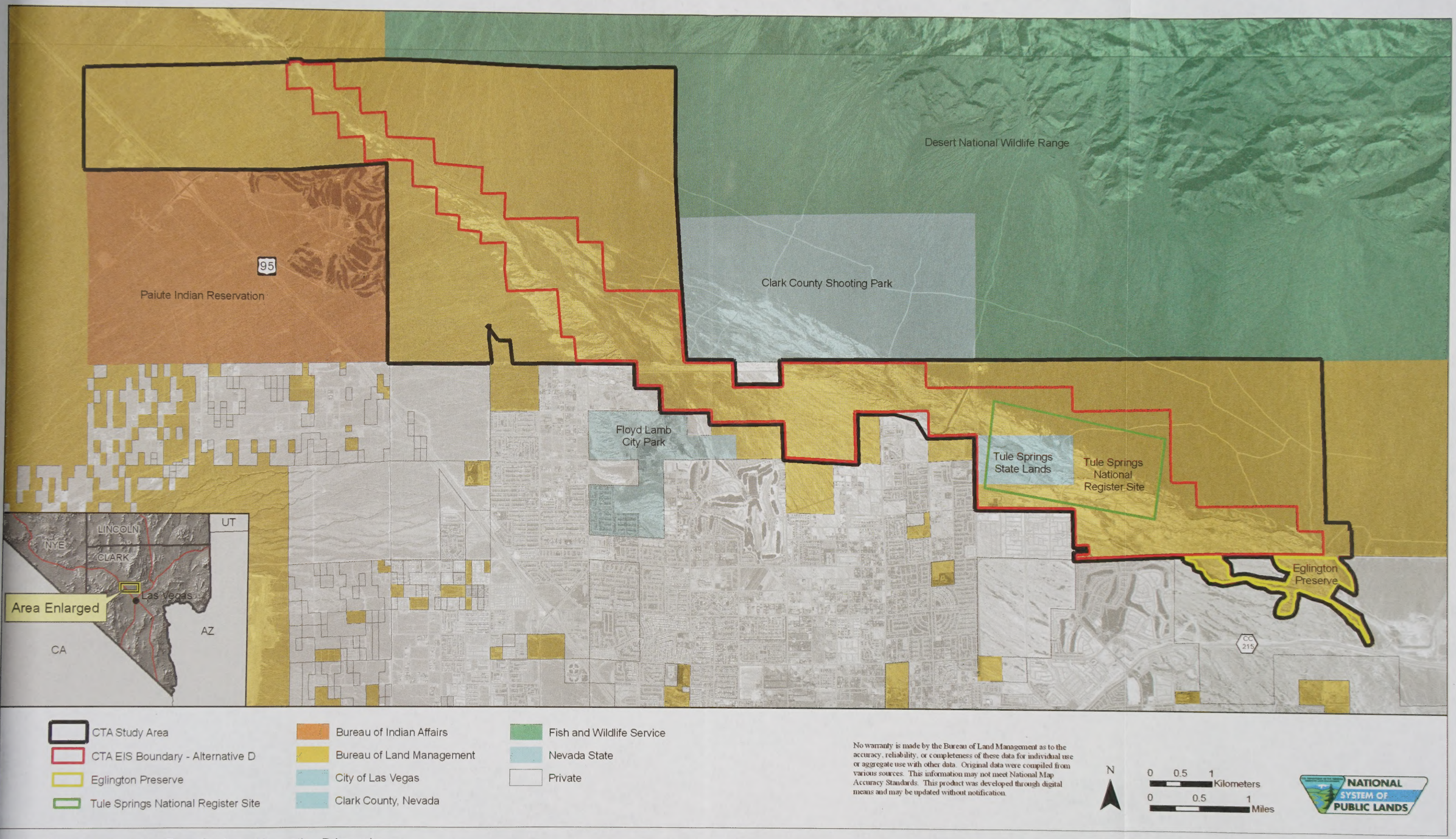

Figure 2.4-4. Conservation Transfer Area Alternative D boundary.

2.4.5 Alternative E

Alternative E (Figure 2.4-5) incorporates the occupied special-status plant habitat outside Eglington Preserve and a portion of the active wash outside the R&PP Act leases and Eglington Preserve. Alternative E reduces the original CTA boundary by 1,686.2 acres. Lands around the Paiute Reservation would be available for private development. Under Alternative E, lands within the CTA would comprise 3,313.8 acres (see Figure 2.4-5) and would continue to be managed for conservation of the sensitive resources and natural functioning of the wash. The 298 acres designated as Eglington Preserve would not be included in the Alternative E boundary.

The boundary would leave 2,402 acres available to the City of North Las Vegas for development and 7,609 acres available to the City of Las Vegas for development. Under this alternative, 10,010.3 acres within the CTA study area would be available for disposal. The Alternative E boundary does not allow waters flowing down the alluvial fans of the Sheep and Las Vegas ranges to continue in their current condition.

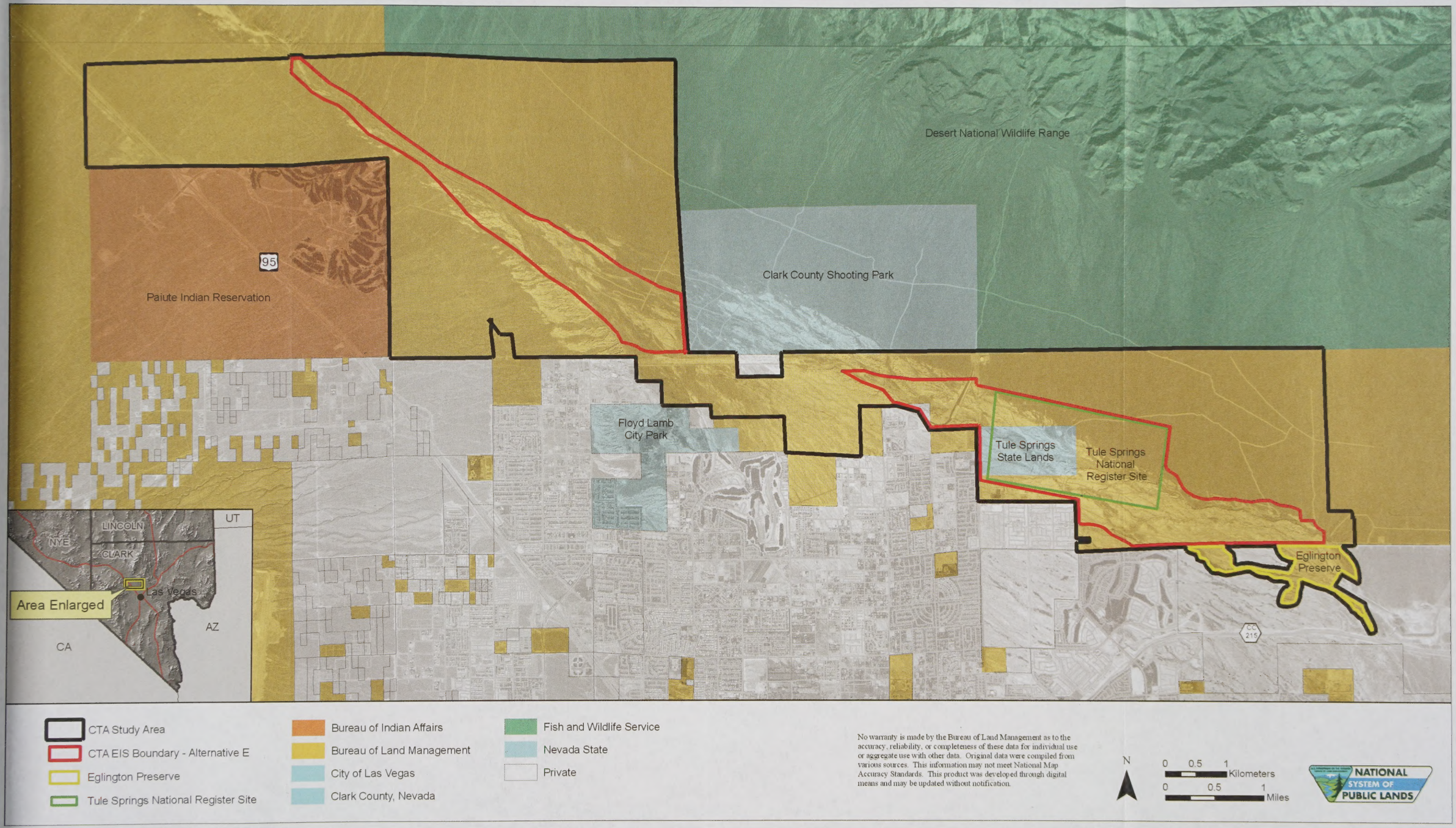

Figure 2.4-5. Conservation Transfer Area Alternative E boundary.

2.4.6 No-Action Alternative

The No-Action Alternative comprises 1,448.2 acres and includes the BLM portion of Tule Springs and Eglington Preserve.

Under the No-Action Alternative (Figure 2.4-6), the entire CTA, with the exception of 1,448.2 acres (Eglington Preserve and Tule Springs), would be available for disposal in accordance with the SNPLMA, FLPMA, other applicable laws subject to valid existing rights, and stipulations established by the Conservation Agreement. Under the No-Action Alternative, 12,174.5 acres would be available for disposal—3,111 within the City of North Las Vegas and 9,064 within the City of Las Vegas.

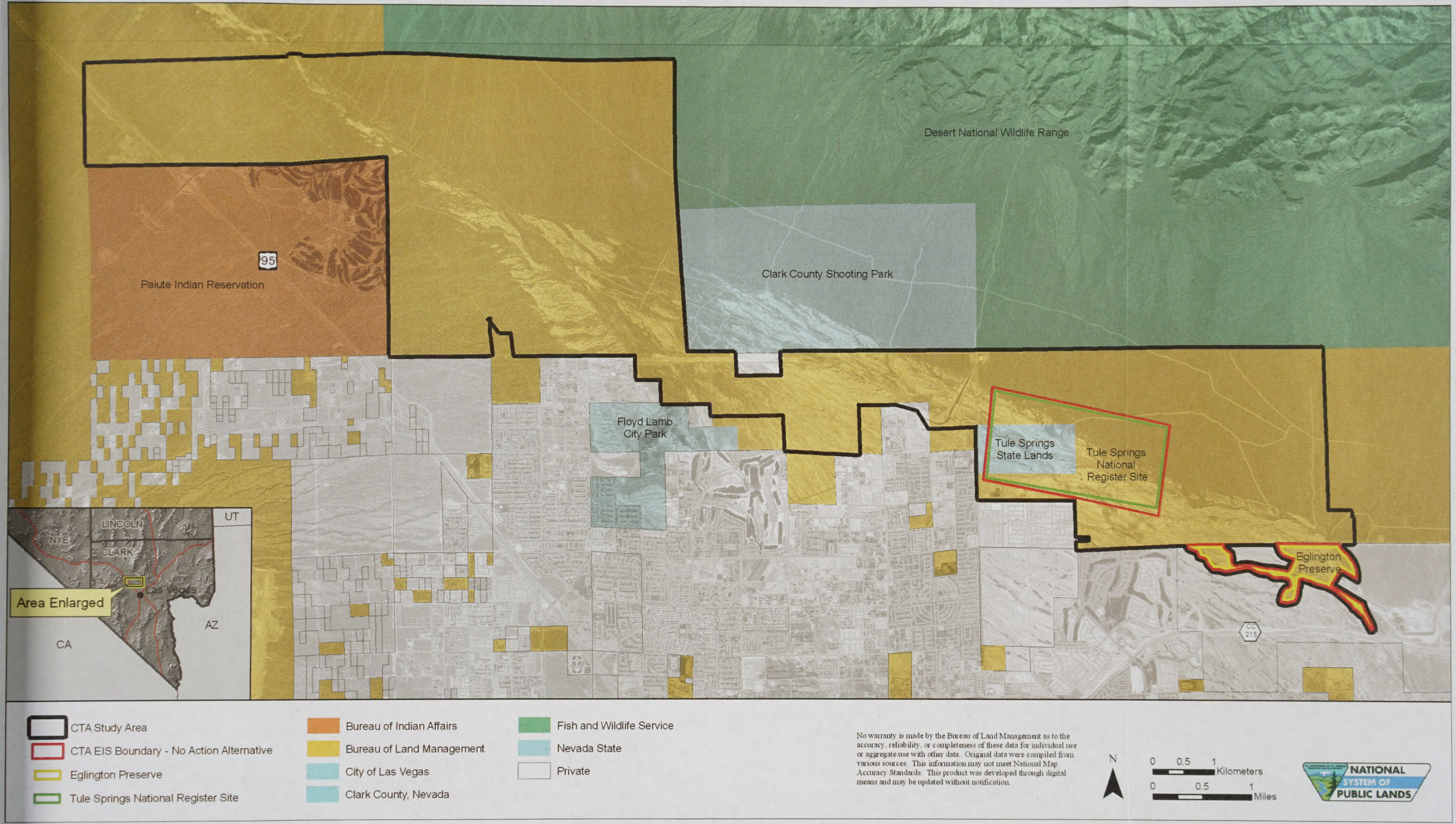

Figure 2.4-6. Conservation Transfer Area No-Action Alternative boundary.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

2.5.1 Expanded Wash Alternative—9,054 Acres

The BLM developed the expanded wash alternative during initial CTA stakeholder meetings. The expanded wash alternative would have added to the original 5,298-acre CTA No-Action Alternative an approximately 400-acre portion of the creosote bajada to the north as a buffer to future development, resulting from a 1-mile buffer north and 0.5 mile east of the Paiute Reservation plus the 300-acre Eglington Preserve.

Up to 4,568.7 acres would have been made available for disposal and private development. Future potential development north of the CTA would have required some supporting infrastructure consistent with protection of the resources. West of Decatur Boulevard, up to three 100-foot-wide ROWs for new roads and utilities would have been considered. East of Decatur Boulevard, only ROWs and land use authorizations that would facilitate the resource protection goals of the CTA would have been allowed. All ROWs and land use authorizations not consistent with the resource protection goals of the CTA would be located outside the CTA.

Although the expanded wash alternative would meet the project purpose and need, it was eliminated from further consideration because the boundary was not sufficiently different from the other alternatives to contribute to the analysis of a range of reasonable alternatives.

2.5.2 Protected Area Designation Alternative—13,622 Acres

During public scoping, BLM received a number of comments requesting that the entire 13,622-acre CTA study area be designated an NCA or National Monument and retained under BLM management. While BLM can have management responsibility for NCAs and National Monuments, BLM has no authority to make those designations. NCAs are established by Congress through enabling legislation. National Monuments are established through Presidential Proclamation under authority of the Antiquities Act of 1906. Congress can also designate National Monuments through monument-specific legislation. This alternative was eliminated from further consideration in the SEIS because these designations require Presidential and/or Congressional action.

2.5.3 Addition of 160 Acres of Lands East of Floyd Lamb Park

A number of comments focused on a request to include within the CTA the 160 acres located in the NW ¼ of Section 11, Township 19 South, Range 60 East. This parcel is part of an R&PP Act lease (N-62830) to the City of Las Vegas but was not previously identified in any of the public stakeholder meetings. Comments focused on the resources, such as fossils, plants, and wash function, as a reason to incorporate the land into the CTA alternatives. The site was evaluated by a BLM botanist, hydrologist, and paleontologist and by the SBCM during their 2003 fossil inventory. BLM concluded that although the parcel contains evidence of the LVF, the parcel does not contain habitat for any special-status species, does not contain surface fossil material, and does not contribute significantly to the function of the ULVW. BLM will provide direction to the City of Las Vegas to use a Discovery Plan for any excavations on the parcel in order to treat subsurface fossils that may be uncovered during future construction.

2.5.4 Consideration of Allowable Uses

Stakeholders suggested a number of specific allowable uses consisting of trails, roads, and utilities. The allowable uses identified by the stakeholders were considered to be allocative and would require a land use plan amendment in order to implement, which is beyond the scope of this SEIS process, which is to establish a CTA boundary. The BLM used the stakeholder suggestions to define future development scenarios. Based on these scenarios, disturbance footprint acreages were estimated and included in chapter 4 as an assumption for analysis in order to conduct alternative and cumulative impacts analysis.

2.5.5 Consideration of Alternative Managing Entities

Although the LVVDB ROD directed the BLM to transfer land in the CTA to another entity pursuant to an approved and signed conservation strategy agreement, the SNPLMA operates under other applicable laws, and BLM is not required to dispose of all lands within the disposal area as established by SNPLMA and amended by Title IV of the Clark County Act of 2002 (PL 107-282). BLM would continue to manage resources within the final established boundary until such time as an outside entity meets the requirements of a BLM-approved conservation management strategy.

2.5.6 Alternative D2 as Recommended by the Cities of Las Vegas and North Las Vegas

Alternative D2 was developed by the Cities of Las Vegas and North Las Vegas as part of their comment submittal on the Draft SEIS. It is a modified version of Alternative D, with boundary revisions west of Decatur Boulevard to increase protection of sensitive plant species and paleontological resources. Additionally, Alternative D2 is intended to reduce the environmental effects of displaced development and provide for the transmission of green energy. The consideration of a transmission corridor is not being addressed in this SEIS and so was eliminated from further detailed analysis. Future land use allocations on BLM lands, including those in the final CTA boundary, will be determined through the Southern Nevada District RMP revision.

The BLM has revised the Preferred Alternative boundary north of the Paiute Reservation based in part on comments received from the Cities of Las Vegas and North Las Vegas and the Las Vegas Paiute Tribe. However, the BLM determined that the Alternative D2 boundary was not sufficiently distinct to be considered for detailed analysis because of its similarity to the Alternative C boundary west of Decatur Boulevard.

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Chapter 3
AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter identifies the affected environment and focuses on the existing resources and uses that have the potential to be affected by changes to the CTA boundary. The affected environment is the baseline against which each project alternative is evaluated in terms of impacts to the human environment that would result from its implementation. We take a comprehensive approach to interpreting what makes up the human environment to potentially be affected by the project alternatives and include in our study both natural and physical resources and people's relationship to those resources [40 CFR 1508.14].

The affected environment discussed in this chapter includes earth resources, air quality, water resources, biological resources, cultural and historical resources, Native American resources, paleontological resources, visual resources, land uses, recreation, transportation and access, hazardous materials, social and economic conditions, environmental justice issues, and public health and safety. Relevant current environmental conditions and human uses within the CTA study area have been identified and described using geographic information system (GIS) data, literature searches, electronic searches, personal interviews, and detailed field surveys. Much of the information presented in this chapter is derived from the LVVDB FEIS (BLM 2004a) and other studies, site-specific field data collected by USU, and information provided by BLM resource specialists.

3.2 EARTH RESOURCES

The term *earth resources* encompasses the surface and subsurface characteristics of the landscape, including geology and soils. Following is a brief overview of the physical features of the CTA study area. Section 3.2, "Earth Resources," of the LVVDB FEIS (BLM 2004a) provides a detailed discussion of the entire disposal area.

3.2.1 Geological Setting

Located in the northern portion of the LVV, the CTA study area is situated within the Great Basin region of the Basin and Range physiographic province. The Spring Mountains border the CTA study area limits to the southwest, and the Sheep and Las Vegas ranges skirt the region to the north. The CTA study area encompasses a series of broad, alluvial fans bisected by the LVW and its tributaries. Extending northwest to southeast through the study area, the LVW is an active drainage system that serves as a conduit for emptying urban runoff and stormwater into Lake Mead.

The underlying geology within the CTA study area consists of the LVF, a series of light-colored clay and silt deposits exposed along the ULVW (Longwell et al. 1965). The LVF is divided into seven stratigraphic units, labeled A through G. Unit A is stratigraphically the lowest and temporally the oldest, whereas Unit G is the top layer of the formation and represents the most recent deposit. A detailed description of each stratigraphic unit can be found in Section 3.6, "Paleontological Resources."

The LVF is overlain by a complex blend of alluvial deposits that began accumulating during the late Pleistocene and continued accumulating throughout the Holocene (11,000 B.P.–present). The banks of the LVW predominantly comprise young and older young alluvium interspersed with fine-grained deposits

characteristic of previous groundwater discharge (Page et al. 2005). The LVW bed is a braid of youngest alluvium, young fan alluvium, and groundwater discharge deposits.

Although it is seismically active, the LVV has experienced very few earthquakes that measure greater than 5.0 on the Richter scale (Nevada Seismological Laboratory 2006). A series of smaller-scale earthquakes registering magnitudes up to 4.9 has been recorded, mostly in the vicinity of mountain ranges or near fault lines. No earthquakes have been recorded within the CTA study area. There are several inactive faults that extend through the CTA study area limits, most notably the Las Vegas Valley Shear Zone (Taylor 2007). The CTA study area is located within Seismic Zone 2B, which means that the area has the potential to sustain moderate damage during a seismic event.

In addition to earthquakes, subsidence and ground fissures also pose geological hazards within the LVV. Subsidence is the settling of the earth's surface. This effect can be caused by a variety of factors, including groundwater withdrawal, mineral extraction, and faulting. Fissures are cracks in the earth's surface that are caused by the collapse and compaction of subsurface sediments into residual gaps left by excessive groundwater pumping. Ground fissures and subsidence have been reported in the LVV but not specifically within the CTA study area.

3.2.2 Soils

A number of soil associations are present within the CTA study area, including a variety of gravelly and sandy loams formed in limestone, dolostone, and sandstone (Natural Resources Conservation Service [NRCS] 2007). Table 3.2-1 provides a summary of the soil associations identified within the CTA study area, along with the corresponding map unit identification (ID). USU refined the soil association map of the CTA study area using high-resolution aerial photography combined with field sampling and laboratory analysis. USU was able to better define soil associations in the southeastern part of the study area, particularly in areas in which special-status plants have been observed. Specifically, areas south of the ULVW channel that were originally mapped as 540-Weiser association were found to be more typical of 192–Dalian-McCullough complex (USU 2008a).

Table 3.2-1. Soil Associations within the CTA Study Area

Map Unit ID	Association	Description	Map Reference
192	Dalian-McCullough	Well-drained, very gravelly, fine, sandy loam derived from limestone and dolostone and found on fan skirts.	NV788
314	Weiser-Wechech	Well-drained, extremely gravelly, sandy loam derived from limestone and dolostone.	NV788
630	Badland	Stratified sand, silt, and clay with gypsum and calcium carbonate formed on the Muddy Creek Formation.	NV788
305	Las Vegas–DeStazo	Well-drained, gravelly, fine, sandy to clay loam derived from limestone and found on alluvial flats.	NV788
112	Arizo	Excessively drained, stratified, gravelly, loamy sand to cobbly, coarse sand formed in mixed alluvium and found along channels.	NV788
540	Weiser	Well-drained, stratified, extremely gravelly sandy loam to very gravelly, fine, sandy loam derived from limestone and dolostone found on fan remnants.	NV788
542	Weiser-Goodsprings	Well-drained, extremely gravelly, fine, sandy loam derived from limestone, dolomite, and gypsum and found on fan remnants.	NV788
300	Las Vegas	Well-drained, gravelly, fine, sandy to clay loam derived from limestone and found on basin-floor remnants.	NV788
240	Goodsprings	Well-drained, gravelly, fine, sandy loam to extremely gravelly, loamy, fine sand derived from limestone and sandstone and found on fan remnants.	NV788

According to the Clark County Department of Development Services Building Division and as further documented in the 2004 LVVDB FEIS, expansive soils are concentrated along the ULVW drainage. Expansive soils have a high concentration of clay, which can act like a sponge, shrinking and swelling with changing moisture conditions. Soils in the CTA study area may have other characteristics that could lead to problems for future construction projects. Specific soil properties would be evaluated prior to commencing any future construction activities.

3.3 WATER RESOURCES

The LVVDB FEIS (BLM 2004a) described the conditions of water resources in the LVV, provided descriptions of surface and groundwater resources, and also discussed water supply and demand in this region. This section describes the same resources but focuses on the CTA study area. Any changes in the condition of resources from the time of their description in the LVVDB FEIS are noted below.

3.3.1 Surface Water

The LVVDB FEIS provided a description of the network of ephemeral drainages that convey stormwater runoff from the LVV to the Colorado River. The majority of information presented in that document remains applicable to the current SEIS. The CTA study area is in the ULVW watershed and is drained by the ULVW and several tributaries. Because complete urbanization has not yet occurred within areas that drain to the ULVW, the majority of the ULVW length has not yet been significantly impacted by increased flow rates and channel erosion. The ULVW is an ephemeral wash that flows intermittently during and immediately after significant storm events. The upper subbasins flowing into the ULVW are classified geomorphologically as alluvial fans and consist of material ranging in size from boulders to silts. An alluvial fan is a fan-shaped collection of loose or unconsolidated sediments that have been deposited by stream flow or debris flows at the base of a mountain front or valley side (National Research Council 1996). A bajada is formed when neighboring fans converge into a single apron at the base of the slope. Flooding on alluvial fans can occur quickly. Flow paths on fans typically form a braided network of channels, both active and inactive. Near the mouth of the fan, where the slope is greater, channels tend to be more incised, with coarser-grained alluvium. Farther down the fan, as the slope decreases, flows spread out laterally into other channels and sheet flow with more fine-grained sediments. The ULVW can experience radical changes in shape, alignment, depth, and flood-carrying capacity during major storm events. As a result of these characteristics, specialized hydraulic analyses are usually required to adequately assess flooding impacts for both natural and altered conditions (CCRFCD 1999; House 2005). The Federal Emergency Management Agency (FEMA) has developed special guidelines for computing regulatory floodplains for alluvial fans (FEMA 2003). In addition, dramatic changes to the dry wash can occur with adjacent development and related infrastructure. Increased urban development, including channelization of stream courses, installation of storm drains, expanded areas of impervious land cover, and construction of stream crossings, has been occurring in the ULVW watershed and has gradually altered the hydrology of the ULVW in a manner similar to that of the Lower Las Vegas Wash.

There are a number of smaller, mostly unnamed ephemeral washes located throughout the ULVW watershed within the CTA study area. Along with the ULVW, smaller washes that naturally convey storm flows to the ULVW and ultimately into Lake Mead may be considered WUS, as defined under 33 CFR 328. The USACE regulates WUS pursuant to Section 404 of the CWA [33 USC 1251 *et seq.*]. The USACE has permitting authority for the placement of fill into WUS on federal, state, and private lands. The majority of the tributary ephemeral washes within the CTA study area have remained intact. However, the slope draining into the north side of the ULVW shows evidence of an active alluvial surface in several locations along the entire reach within the CTA. That conclusion is based on visual

interpretation of aerial images, available geological mapping (Bell et al. 1998), and criteria established for differentiating between active and inactive surfaces (House 2005).

Runoff from storm events in the ULVW watershed and surrounding mountains can result in flows ranging from a few dozen cubic feet per second (cfs) to several thousand cfs. Because of the lack of development in the upper basin, very few significant floods have been observed or recorded. Under future ultimate build-out conditions, however, 100-year flood flows are estimated to exceed 14,000 cfs upstream of the ULVW detention basin near Decatur Boulevard. That flow rate would cover a football field 1 foot deep in about 3.5 seconds. Peak flows of that magnitude (and even significantly smaller flows) would erode the banks and degrade the channel of the ULVW, which in turn would cause sedimentation in online detention facilities, Las Vegas Bay, and Lake Mead. In addition, development in the ULVW would impact the quantity of fine sediment that is conveyed during storm events via overland sheet flow into the ULVW and to those facilities. Specific flood flow information for the present-day 100-year scenario is not readily available and would require a more complete geomorphic study of the surfaces that drain into the ULVW.

The Regional Flood Control Master Plan map shows that any development that happens north of the wash on the fans would require flood control structures to move the waters. Without any further development, the wash has sufficient natural flood control capacity.

Floodplains

The LVVDB FEIS described the 100-year flood conditions within the LVV watershed. The majority of information presented in that document remains applicable to the current SEIS for the ULVW, with the exception that the upper range of 100-year flood flows would be around 14,000 cfs based on an ultimate projected build-out condition for all available land. FEMA and the CCRFCD have published maps that show the 100-year floodplain and floodway for the ULVW, based on computerized hydraulic models. The 100-year floodplain for the ULVW in the disposal boundary area is shown in Figure 3.3-1. The Flood Zone A and AE areas on the figure are used to designate the extent of the 100-year floodplain. Flood Zone A is an approximate extent for an area that has not been the subject of an accepted hydraulics study. Flood Zone AE is an area that has been the subject of an accepted hydraulics study; thus, base flood elevations have been developed for this zone.

While the CCRFCD and Cities of Las Vegas and North Las Vegas allow development within the floodplain fringe, it is generally discouraged. Proposed development adjacent to and within drainageways with established floodplains must be evaluated by a licensed engineer to confirm compliance with various criteria and to demonstrate that no adverse impacts to adjacent properties would result. Under no circumstances is proposed development permitted in the floodway. The CCRFCD and Cities of Las Vegas and North Las Vegas currently have no formal erosion setback criteria in place. Plans for development adjacent to the ULVW are reviewed by the appropriate jurisdiction on a case-by-case basis and are approved or rejected on the basis of supporting engineering analyses and compliance with appropriate regulations (CCRFCD 2007; personal communication, Raul Cruz, City of Las Vegas Flood Control Division 2008).

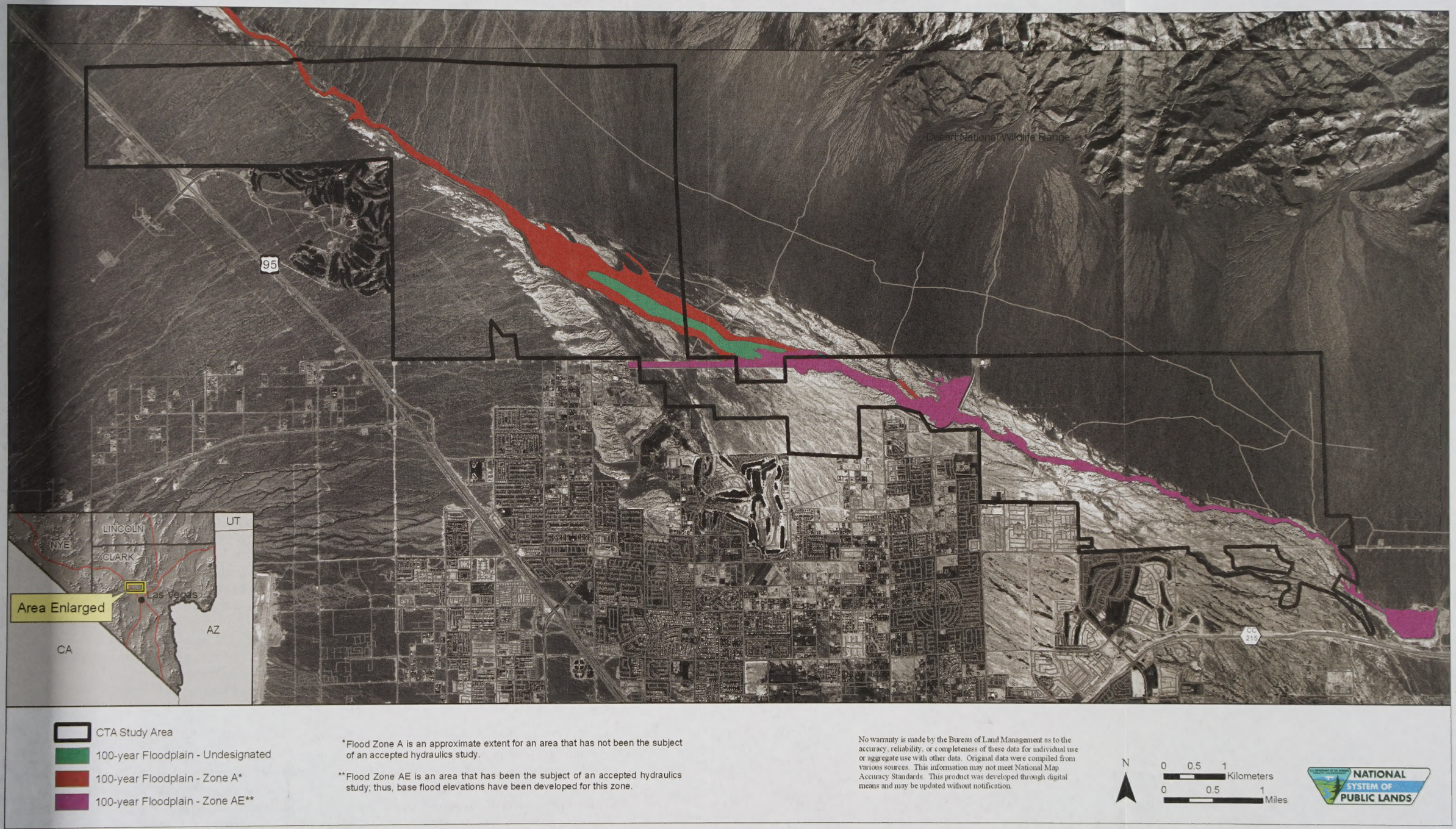

Desert National Wildlife Range
95
LINCOLN
NYE
CLARK
Las Vegas
UT
AZ
CA
Area Enlarged
CC 215
CTA Study Area
100-year Floodplain - Undesignated
100-year Floodplain - Zone A*
100-year Floodplain - Zone AE**
*Flood Zone A is an approximate extent for an area that has not been the subject of an accepted hydraulics study.
**Flood Zone AE is an area that has been the subject of an accepted hydraulics study; thus, base flood elevations have been developed for this zone.
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.
N
0 0.5 1 Kilometers
0 0.5 1 Miles
NATIONAL SYSTEM OF PUBLIC LANDS

Figure 3.3-1. The 100-year Federal Emergency Management Agency floodplain for the Conservation Transfer Area study area.

Surface Water Quality

As described in the LVVDB FEIS, LVW drains the 1,600-square-mile LVV, of which more than 20% has been urbanized. Flow from the LVW enters Lake Mead and has a direct effect on the water quality of the lake, which is an important source of drinking water for portions of Nevada as well as for downstream users. Factors that contribute to poor water quality in flows from the LVW include high concentrations of soluble salts in the soils, urban stormwater, and intercepted, shallow, poor-quality groundwater. There are pending efforts by the Clark County Clean Water Coalition to reduce the volume of wastewater discharged directly to the Lower Wash. This effort, known as the Systems Conveyance and Operations Program, would discharge wastewater directly to Boulder Basin of Lake Mead through a new pipeline.

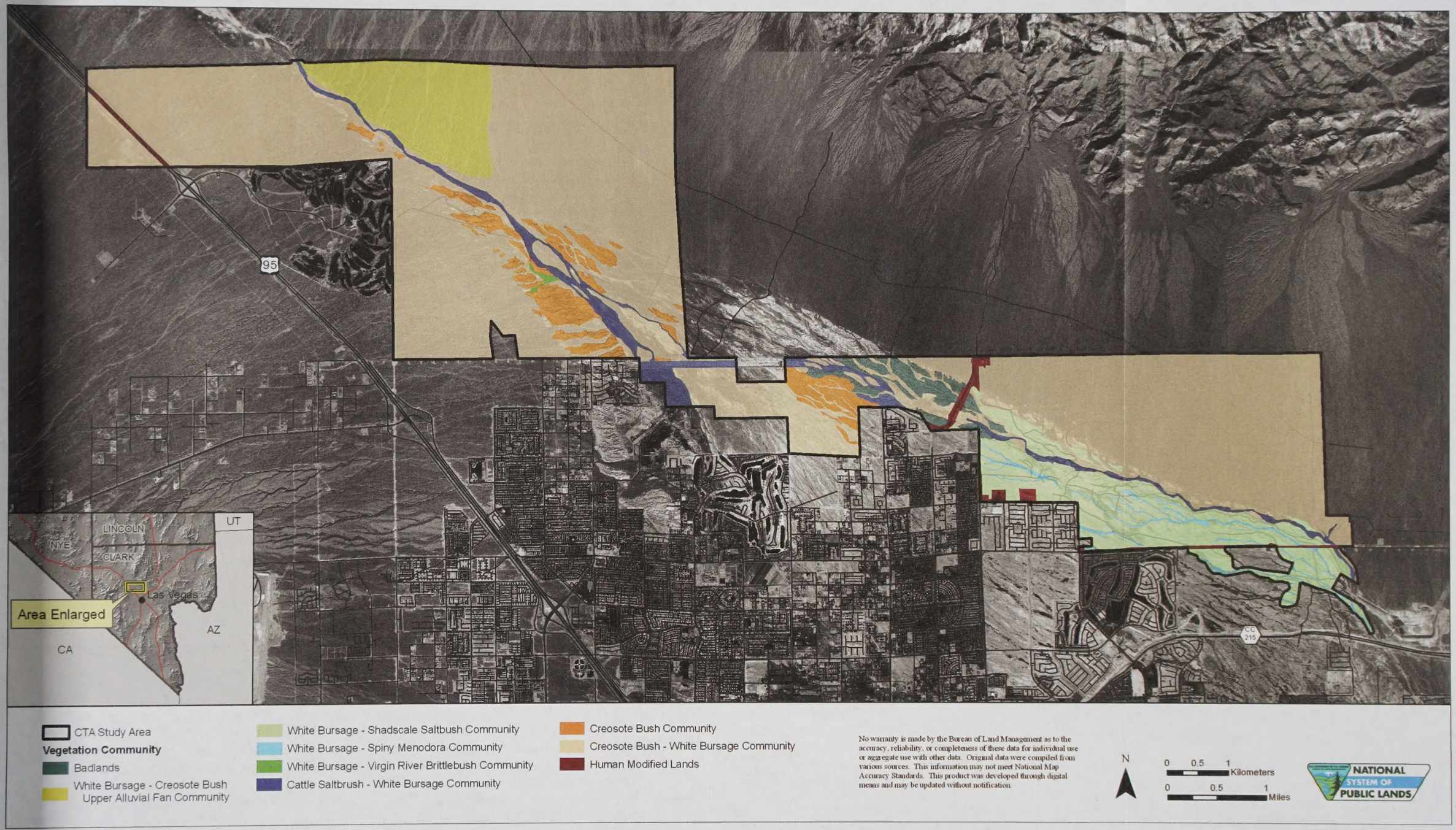
The LVVDB FEIS described issues relating to Section 303(d) of the CWA as they pertain to the LVW. The LVVDB FEIS also detailed the status of total maximum daily loads (TMDLs) for the LVW. As of November 2005, the portion of the LVW that is well downstream of the CTA study area was listed by Nevada Division of Environmental Protection (NDEP) as a 303(d) impaired water body (NDEP 2005). The pollutants or stressors of concern in this listing are total iron and selenium. The source of iron is believed to be associated with suspended sediment particulates, while the source of selenium has not been identified. For these reasons, LVW was identified as a water body warranting further investigation for selenium and total suspended solids. This designation pertains to the portion of LVW that runs between Telephone Line Road and Lake Mead, at the southeast end of the LVV.

In 1989, TMDLs for LVW were established for total phosphorus and ammonia. In 2003, compliance with the established TMDLs was assessed; no changes were recommended at that time. The TMDLs for total phosphorus and ammonia are currently being met by having the wastewater treatment plants use year-round tertiary treatment practices.

3.4 VEGETATION

This section describes the dominant vegetation communities and special-status plant species, including federally threatened, endangered, and candidate species, State of Nevada listed endangered and protected species, BLM special-status species, and other vegetation of interest that occurs in the CTA study area. All vegetation community descriptions are based on the results of the USU vegetation mapping study (USU 2007b), with certain common plant names changed to provide consistency with BLM. Nine vegetation communities have been identified in the CTA study area (see Section 3.4.1, "Vegetation Communities"). These nine vegetation communities (Figure 3.4-1) are distributed in association with the unique geological and hydrologic features of the ULVW, which occurs in the northern portion of the Mojave Desert. The Mojave Desert is a geographically distinct assemblage of natural communities that occurs across portions of southeastern California, northwestern Arizona, southern Nevada, and southwestern Utah. The Mojave Desert is marked by extreme environmental conditions, and the distribution, composition, and density of vegetation communities are strongly influenced by local variations in climate, elevation, and soil conditions.

The Mojave Desert climate is arid, with an average of 4 to 6 inches (10.1–15.2 cm) of precipitation per year and temperatures ranging from 20°F to more than 100°F (−6.7°C to 37.8°C). Rainfall is erratic and concentrated in late winter and early spring. The CTA study area consists predominantly of low desert, with elevations from 2,113 to 3,040 feet (644–927 m) and alkaline soils. The vegetation of the Mojave Desert is characterized by low-growing, widely spaced perennial shrubs, usually composed of only a few species, with cacti and yucca occurring locally; 25% of all plant species are endemic (MacMahon 2000). The vegetation communities that dominate the ULVW serve numerous important functions: vegetation slows and retains floodwaters, provides wildlife habitat, and provides recreational and aesthetic value.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Vegetation Community
Badlands
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White Bursage - Shadscale Saltbush Community
White Bursage - Spiny Menodora Community
White Bursage - Virgin River Brittlebush Community
Cattle Saltbrush - White Bursage Community
Creosote Bush Community
Creosote Bush - White Bursage Community
Human Modified Lands
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.
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Figure 3.4-1. Vegetation communities according to the Utah State University (2007b) vegetation mapping study in the Conservation Transfer Area study area.

In addition, both vegetation and biological soil crusts stabilize the soil, control erosion, and retain moisture (Belnap et al. 2001). However, the distribution of vegetation in the CTA study area is largely determined by geological structure, with lower plant diversity on alluvial fans (71% of the CTA) and more diverse plant communities on more structurally complex spring deposits (29% of the CTA) (USU 2007b).

3.4.1 Vegetation Communities

All vegetation community descriptions are based on the results of the USU vegetation mapping study (USU 2007b), with certain common plant names changed to provide consistency with BLM. Nine vegetation communities have been identified in the CTA study area: White Bursage–Shadscale Saltbush (*Ambrosia dumosa–Atriplex confertifolia*); White Bursage–Creosote Bush (*Ambrosia dumosa–Larrea tridentata*) Upper Alluvial Fan; White Bursage–Virgin River Brittlebush (*Ambrosia dumosa–Encelia virginensis*); White Bursage–Spiny Menodora (*Ambrosia dumosa–Menodora spinescens*); Cattle Saltbush–White Bursage (*Atriplex polycarpa–Ambrosia dumosa*); Creosote Bush (*Larrea tridentata*); Creosote Bush–White Bursage (*Larrea tridentata–Ambrosia dumosa*); the Badlands; and human-modified lands (see Figure 3.4-1).

The acreage and proportion of each vegetation community in the CTA study area are listed in Table 3.4-1. In areas not covered by the USU study (USU 2007b), vegetation communities were developed by comparing aerial photography and adjacent data to extrapolate community designations.

Table 3.4-1. Vegetation Community Types and Acreages in the Conservation Transfer Area Study Area

Vegetation Community Type	Acres in the CTA	% of CTA
Creosote Bush–White Bursage (*Larrea tridentata–Ambrosia dumosa*)	9,684.1	71.1%
White Bursage–Shadscale Saltbush (*Ambrosia dumosa–Atriplex confertifolia*)	1,274.1	9.4%
White Bursage–Creosote Bush (*Ambrosia dumosa–Larrea tridentata*) Upper Alluvial Fan	905.8	6.6%
Creosote Bush (*Larrea tridentata*)	657.1	4.8%
Cattle Saltbush–White Bursage (*Atriplex polycarpa–Ambrosia dumosa*)	540.3	4.0%
Badlands	241.3	1.8%
Human-modified lands (no vegetation)	167.0	1.2%
White Bursage–Spiny Menodora (*Ambrosia dumosa–Menodora spinescens*)	139.8	1.0%
White Bursage–Virgin River Brittlebush (*Ambrosia dumosa–Encelia virginensis*)	13.2	0.1%
Total	**13,622.7**	**100%**

Creosote Bush–White Bursage Community

The Creosote Bush–White Bursage community is the dominant vegetation community and covers approximately 9,684 acres, or 71.1% of the CTA study area. The Creosote Bush–White Bursage vegetation community spans the entire width of the CTA study area at elevations between 2,163 and 3,047 feet (659 and 929 m). In this vegetation community, creosote bush and white bursage have a combined relative density greater than 70%. Littleleaf ratany (*Krameria erecta*) is an important subdominant species. The community also contains numerous woody species at low densities, including shadscale saltbush, cattle saltbush, Virgin River brittlebush, and jointfir (*Ephedra* spp.). This community also has a high density (207 plants per acre) and diversity of cactus and yucca (see Section 3.4.2, "Cactus and Yucca").

White Bursage–Shadscale Saltbush Community

The White Bursage–Shadscale Saltbush community covers approximately 1,274 acres, or 9.4% of the CTA study area. It occurs primarily on spring deposits south of the wash environment at elevations between 2,163 and 2,375 feet (659 and 724 m) in the southeastern portion of the CTA study area. The vegetation is strongly dominated by shadscale saltbush, white bursage, and cheesebush (*Hymenoclea salsola*); creosote bush and wolfberry (*Lycium andersonii*) are important subdominant species. Additional species include jointfir, littleleaf ratany, and spiny menodora.

White Bursage–Creosote Bush Upper Alluvial Fan Community

The White Bursage–Creosote Bush Upper Alluvial Fan community covers approximately 905 acres, or 6.6% of the CTA study area. This vegetation community occurs at elevations between 2,647 and 2,873 feet (807 and 876 m) on upper alluvial fan geomorphology that is restricted to the north-central portion of the CTA study area. The vegetation is dominated by white bursage and creosote bush; the presence of shadscale saltbush may indicate higher soil alkalinity than adjacent habitats. Nevada jointfir (*Ephedra nevadensis*) is also a conspicuous component of this community type. Additional species include Virgin River brittlebush, spiny menodora, and Mojave woodyaster (*Xylorhiza tortifolia*). This community has a high density (157 plants per acre) of cactus and yucca (see Section 3.4.2).

Creosote Bush Community

The Creosote Bush community is widespread across the western and central portions of the wash on approximately 657 acres, or 4.8% of the CTA study area, at elevations between 2,390 and 2,716 feet (728 and 828 m). Creosote bush is the dominant shrub, with white bursage, littleleaf ratany, and Fremont's dalea (*Psorothamnus fremontii*) as important subdominant species. Shadscale saltbush, turpentinebroom (*Thamnosma montana*), and Mojave woodyaster occur patchily within this community.

Cattle Saltbush–White Bursage Community

The Cattle Saltbush–White Bursage community occurs on approximately 540 acres, or 4.0% of the CTA study area, at elevations between 2,160 and 2,725 feet (658 and 851 m). This community occurs predominantly in wet or active wash areas throughout the LVW and likely receives more water than the surrounding habitats. Cattle saltbush and white bursage are dominant, and creosote bush and cheesebush are important subdominant species. Virgin River brittlebush, Mojave rabbitbrush (*Ericameria paniculata*), and snakeweed (*Gutierrezia* spp.) are also important species. Minor species include fourwing saltbush (*Atriplex canescens*), shadscale saltbush, wolfberry, and brownplume wirelettuce (*Stephanomeria pauciflora*). This community had a low density (16 plants per acre) of cactus and yucca (see Section 3.4.2).

Badlands

The Badlands community is mostly barren ground covering approximately 241 acres, or 1.8% of the CTA study area, at elevations between 2,314 and 2,433 feet (705 and 742 m) in the north-central portion of the CTA study area. A small proportion of badlands was found to contain low densities of white bursage, littleleaf ratany, creosote bush, and brownplume wirelettuce.

Human-Modified Lands

Human-modified lands include areas of significant human disturbance or human-caused impacts that limit the growth of vegetation, such as paved or gravel surfaces, utility substations, water retention structures,

and other water structures, in the CTA study area. This classification only includes impacted areas greater than 2.47 acres and covers approximately 167 acres, or 1.2% of the CTA study area. This classification occurs primarily in the central portion of the CTA study area, near Decatur, where U.S. Highway 95 crosses through the west end of the CTA study area. Human-modified lands occur at elevations between 2,209 and 2,966 feet (673 and 904 m).

White Bursage–Spiny Menodora Community

The White Bursage–Spiny Menodora community occurs on approximately 139 acres, or 1.0% of the CTA study area, at elevations between 2,187 and 2,347 feet (667 and 715 m) in the southeastern portion of the CTA study area. This vegetation association includes desert wash habitats, which provide valuable habitat for a variety of common and special-status plant and wildlife species. White bursage dominates the community; creosote bush, spiny menodora, and littleleaf ratany are important subdominant species. Other conspicuous species include shadscale saltbush, Torrey's jointfir (*Ephedra torreyana*), and wolfberry. Minor species include fourwing saltbush, Nevada jointfir, snakeweed, winterfat (*Krascheninnikovia lanata*), wolfberry, and Mojave woodyaster.

This is the only vegetation association that was identified in the USU vegetation mapping study (USU 2007b) as containing catclaw acacia and mesquite (*Prosopis* sp.). Although these plant species are not federally or state listed for protection, catclaw acacia and mesquite habitat, especially when infected with fruiting mesquite mistletoe (*Phoradendron californicum*), supports populations of phainopepla, a BLM special-status bird species. Small, scattered stands or bosques grow in ephemeral drainages along the LVW. The ULVW contains a high density of these bosques, scattered throughout the southeastern portion of the CTA, which has high plant density. The USU (2007b) vegetation mapping study noted acacia occurring at medium density (78.6 plants per acre) within the White Bursage–Spiny Menodora association. Mesquite was not noted in the USU vegetation data but is suspected to occur in association with acacia in the lower portion of the wash (personal communication, Glen Busch, USU, January 22, 2008).

White Bursage–Virgin River Brittlebush Community

The White Bursage–Virgin River Brittlebush community occurs on approximately 13.2 acres, or 0.1% of the CTA study area, at elevations between 2,553 and 2,595 feet (778 and 791 m), limited to the west-central portion of the LVW. White Bursage, Virgin River brittlebush, and snakeweed dominate this community. Creosote bush and Fremont's dalea are also important species. Other species include cheesebush and rush skeletonplant (*Lygodesmia juncea*). Minor species include Shockley's goldenhead (*Acamptopappus shockleyi*), Nevada jointfir, Torrey's jointfir, wolfberry, and slender poreleaf (*Porophyllum gracile*). This community contains a high density of cactus and yucca (see Section 3.4.2).

3.4.2 Cactus and Yucca

All native cacti and yucca are protected and regulated by the State of Nevada under Nevada Revised Statutes (NRS) 527.060 and 527.120 (Appendix C). This provision regulates the removal and transportation of listed plant species on state lands, county lands, reserved or unreserved lands owned by the federal government, and privately owned lands without written permission, permit, and/or tag issued by the NDF.

Cacti species within the CTA study area include golden cholla (*Cylindropuntia echinocarpa*), branched pencil cholla (*Cylindropuntia ramosissima*), cottontop cactus (*Echinocactus polycephalus* var. *polycephalus*), Engelmann's hedgehog cactus (*Echinocereus engelmannii*), California barrel cactus

(*Ferocactus cylindraceus*), and beavertail pricklypear cactus (*Opuntia basilaris* var. *basilaris*). Yucca species within the CTA study area consist of Joshua tree (*Yucca brevifolia*) and Mojave yucca (*Yucca schidigera*). The USU vegetation data were used to determine the relative densities of cacti and yucca in each vegetation community (Table 3.4-2). The highest density and diversity of cacti and yucca were found in the Creosote Bush–White Bursage community. The White Bursage–Creosote Bush Upper Alluvial Fan and White Bursage–Virgin River Brittlebush communities contain high densities of yucca but few cacti. No areas were classified as medium-density cacti and yucca, but the Cattle Saltbush–White Bursage community had low densities of cacti.

Table 3.4-2. Cactus and Yucca Density Rankings and Vegetation Communities in the CTA Study Area

Vegetation Community	Plants/Acre
High Density	
Creosote Bush–White Bursage community	207.1
White Bursage–Creosote Bush Upper Alluvial Fan community	157.2
White Bursage–Virgin River Brittlebush community	104.8
Low Density	
Cattle Saltbush–White Bursage community	16.6

Source: USU (2007b).

3.4.3 Special-Status Plant Species

The unique geological and hydrologic features of the ULVW are host to a suite of plant species endemic to the northern Mojave Desert. The ULVW, including the southeastern portion of the CTA study area, contains a substantial proportion of extant populations of three special-status plant species: Las Vegas bearpoppy, Merriam's bearpoppy, and Las Vegas buckwheat (Table 3.4-3).

Table 3.4-3. Special-Status Plant Species Known to Occur in the CTA Study Area

Common Name	Scientific Name	Federal Status	BLM Sensitive List	State of Nevada*	MSHCP Covered†
Las Vegas buckwheat	*Eriogonum corymbosum* var. *nilesii*	Candidate	No§	No	No
Las Vegas bearpoppy	*Arctomecon californica*	None‡	No§	CE	Yes
Merriam's bearpoppy	*Arctomecon merriamii*	None‡	Yes	No	Yes

Sources: CCDCP and USFWS (2000); Nevada Natural Heritage Program (2003); USFWS (2003, 2007a, 2007b).

* CE = State of Nevada Critically Endangered (NRS 527.270; see Appendix C).

† *Clark County Multiple Species Habitat Conservation Plan* (CCDCP and USFWS 2000).

‡ Although this species does not have official federal status, the USFWS considers it a "species of special concern."

§ Species that have state or federal protection are not generally included on the BLM Sensitive list (see Appendix C).

Potentially genetically unique populations of these three plant species occur within the CTA study area (Ellis and Wolf 2006; Harper and Van Buren n.d. [1997]; Hickerson and Wolf 1998; Van Buren and Harper 1996). All three species are in rapid decline in the LVV as a result of urban development (CCDCP and USFWS 2000) (see Table 3.4-3). The USFWS and NDF have stated that further loss of individuals and populations would be detrimental to the long-term viability of Las Vegas bearpoppy and Las Vegas buckwheat and could lead to emergency listing under the ESA (BLM 2004a). The recent listing of Las Vegas buckwheat as a candidate for federal listing (72 *Federal Register* December 6, 2007) underlines this potential.

The preservation of occupied and potential habitats within the CTA study area will reduce impacts to these species and may prevent further listing actions by the USFWS (USFWS 2004).

The special-status plant species addressed here all occupy extreme soil environments in which other plants are unable to compete. All three species are thought to be associated with gypsum soils. Specific soil factors that limit the distributions of Las Vegas buckwheat or the bearpoppy species have yet to be determined, although USU researchers recently developed a predictive habitat model for these badland species (USU 2008a). For the purposes of this SEIS, occupied habitat includes each observed individual plant location plus a radius of 25 feet (7.6 m) from that point. Using that methodology, plants within 50 feet (15.2 m) of one another were considered part of the same occupied habitat population (PBS&J 2005). Potential habitat was determined by using GIS software to overlay vegetation and soil data to develop a habitat type (vegetation–soil community) data set. Occupied habitat was then overlaid on the habitat type data set and queried to determine potential habitat (e.g., habitat types that support the species). Any habitat type with less than 1% occupied habitat within it was considered an accidental occurrence resulting from GIS resolution or mapping errors and was eliminated as potential habitat. Additionally, any habitat type with the human-modified lands vegetation community was removed from potential habitat because it is highly unlikely that it would support viable plant populations. Potential habitat was then divided into high and moderate potential. Potential habitat adjacent to (within 100 feet [30.4 m] of) occupied habitat was determined to be the most likely to become occupied and was defined as high potential. The remaining potential habitat polygons were defined as moderate potential. All other areas within the CTA study area boundary are considered low-potential habitat that is unlikely to support buckwheat or bearpoppy because it contains the incorrect soil and/or vegetation communities.

Habitat loss and fragmentation form the primary threat to these plant species. Additional potential impacts include trampling by livestock or feral burros, mineral exploration and development, and alteration of hydrology within their habitats. Within the CTA study area, current direct impacts to these species include trampling, OHV use, illegal dumping, invasive plant species, and direct or indirect impacts to their pollinators and habitats (Nevada Natural Heritage Program [NNHP] 2007).

Federally Listed Plant Species

LAS VEGAS BUCKWHEAT

On December 6, 2007, the USFWS listed Las Vegas buckwheat, a long-lived perennial shrub, as a candidate species under the ESA because of threats to the remaining 892 acres of occupied habitat (USFWS 2007b). The primary threat to the species is loss or fragmentation of its habitats from urban development. Historically, 50% to 70% of the Las Vegas buckwheat population and habitat area occurred within the LVV (NNHP 2007), where populations have been evaluated (Ellis and Wolf 2006). Approximately 30% to 50% of these populations have been extirpated or are likely to be extirpated in the near future (NNHP 2007). In the LVV, the species is now concentrated in the southeastern portion of the CTA study area, with scattered remnant populations in the Las Vegas metropolitan area. Populations that occur to the north and east in Clark and Lincoln counties, Nevada, and in Kane County, Utah, are under less immediate threat (NNHP 2007; USFWS 2007a, 2007b). The total population is currently estimated at 25,214 individuals, with approximately 6,800 plants (27% of the total population) in the CTA study area, including Eglington Preserve (USFWS 2007a). The USU vegetation mapping study (USU 2007b) identified 125.17 acres of known occupied habitat in the CTA study area, or 0.9% of the CTA study area. However, this habitat represents 14% of the species' extant occupied habitat. An additional 815.46 acres of high-potential and 340.86 acres of moderate-potential Las Vegas buckwheat habitat (8.5% of the CTA study area) were also identified within the CTA study area (Figure 3.4-2, Table 3.4-4). The species occurs primarily within the White Bursage–Shadscale Saltbush Community but also occurs in adjacent communities in small percentages (see Table 3.4-4).

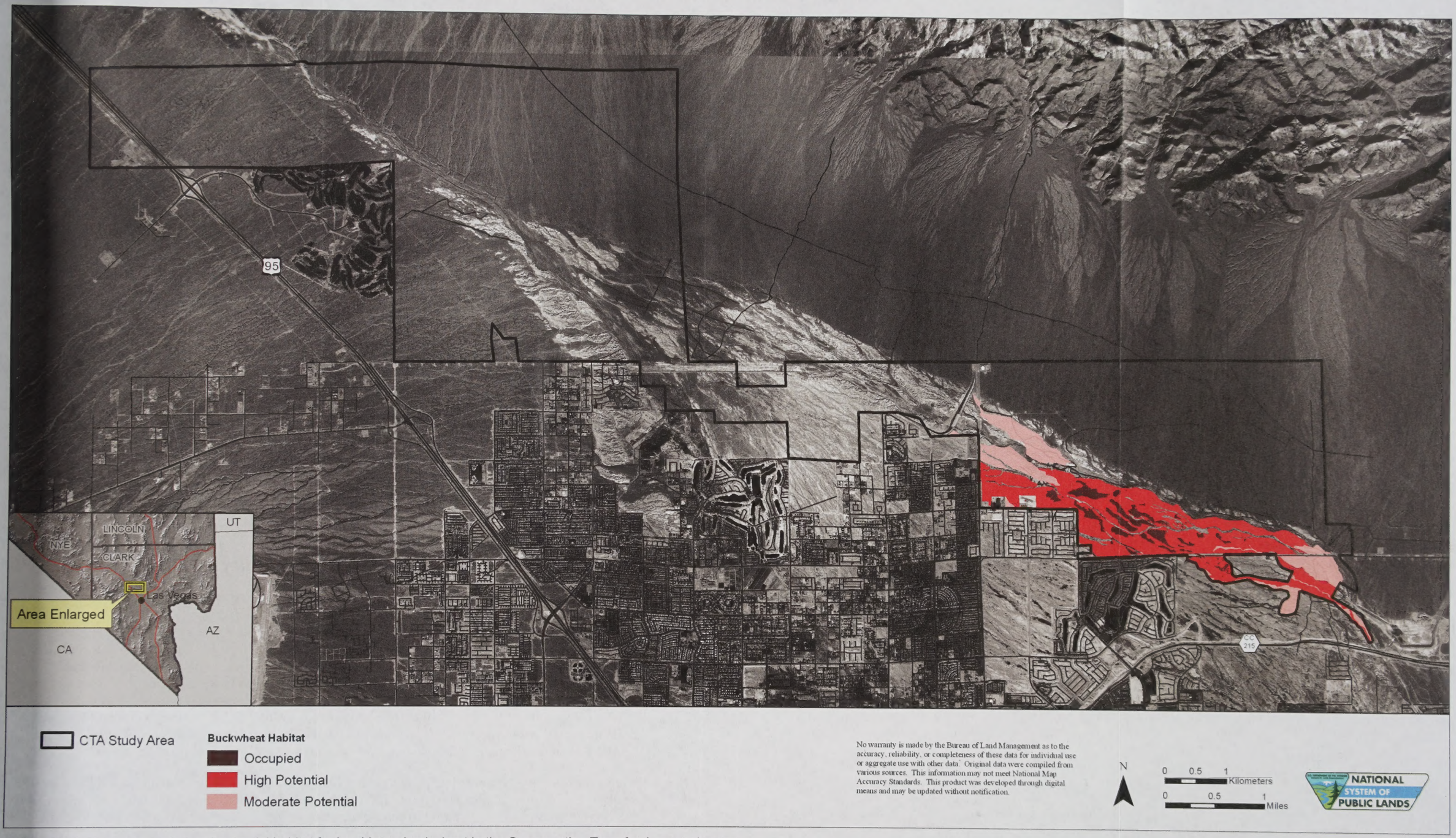
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Figure 3.4-2. Known occupied and potential habitat for Las Vegas buckwheat in the Conservation Transfer Area study area.

Table 3.4-4. Occupied and Potential Habitat for Las Vegas Buckwheat

Habitat Type		Acres of Occupied Habitat per Soil-Vegetation Association	% Total Occupied Habitat	Acres of High-Potential Habitat per Soil-Vegetation Association* Soil Type	Acres of Moderate-Potential Habitat per Soil-Vegetation Association* Soil Type
Soil Type	**Vegetation Community**				
Las Vegas gravelly, fine, sandy loam, 0%–2% slopes	White Bursage–Shadscale Saltbush	43.84	35%	248.70	129.52
Las Vegas–DeStazo complex, 0%–2% slopes	White Bursage–Shadscale Saltbush	40.77	33%	215.28	59.44
Badland	White Bursage–Shadscale Saltbush	34.85	28%	254.41	113.32
Las Vegas gravelly, fine, sandy loam, 0%–2% slopes	White Bursage–Spiny Menodora	2.98	2%	28.92	21.04
Weiser extremely gravelly, fine, sandy loam, 2%–8% slopes	White Bursage–Shadscale Saltbush	1.69	1%	68.14	17.54
Badland	White Bursage–Spiny Menodora	0.67	<1%	0	0
Las Vegas–DeStazo complex, 0%–2% slopes	White Bursage–Spiny Menodora	0†	<1%	0	0
Weiser extremely gravelly, fine, sandy loam, 2%–8% slopes	White Bursage–Spiny Menodora	0.01	<1%	0	0
Las Vegas gravelly, fine, sandy loam, 0%–2% slopes	Human-modified lands	0.37	<1%	0	0
Las Vegas–DeStazo complex, 0%–2% slopes	Human-modified lands	0†	<1%	0	0
Total Habitat		**125.17**		**815.46**	**340.86**

Sources: NRCS (2007); USU (2007b).

* In accordance with the methodology, human-modified lands and habitat types <1% do not constitute potential habitat.

† The exact value is 0.001.

BLM Special-Status and State of Nevada Protected Plant Species

LAS VEGAS BEARPOPPY AND MERRIAM'S BEARPOPPY

Las Vegas bearpoppy is a State of Nevada Critically Endangered plant species (NRS 527.270); therefore, a permit from NDF is required for the take of any individual (see Appendix C). The USFWS considers both bearpoppy species "species of special concern," and both species are also covered under the MSHCP (CCDCP and USFWS 2000) (see Table 3.4-3). It is possible that LVV populations of both species could possess unique genetic traits that are not present elsewhere in their ranges (Harper and Van Buren n.d. [1997]; Hickerson and Wolf 1998; Van Buren and Harper 1996). Las Vegas bearpoppy and Merriam's bearpoppy have distinct distributions in the LVV, but their ranges overlap within the CTA study area; therefore, their distributions and habitats within the CTA study area are addressed jointly here.

Las Vegas bearpoppy is limited to the northeastern Mojave Desert, with 108 population locations in southeastern Nevada, predominantly in Clark County (CCDCP and USFWS 2000), and eight known locations in northwestern Arizona (Mistretta et al. 1996). The LVV contains more than one-third of the total acreage of known Las Vegas bearpoppy habitat (BLM 2004a); however, approximately 27% of the 108 known populations of Las Vegas bearpoppy are under threat of extirpation or are presumed extirpated as a result of urban development in the LVV (CCDCP and USFWS 2000; Mistretta et al. 1996).

Merriam's bearpoppy occurs from the Death Valley area in southeastern California to the Meadow Valley Wash of southeastern Nevada (Meyer 1997). In Nevada, the species is widely but sparsely distributed in approximately 70 to 129 occurrences, with a total estimated population of more than 20,000 individuals over 974 acres in Clark, Lincoln, and Nye counties (NNHP 2001). The overall Merriam's bearpoppy population is stable, except in the LVV, where populations may have been extirpated by development (CCDCP and USFWS 2000). In the CTA study area, Merriam's bearpoppy is known to occur from the Decatur Boulevard alignment east and in association with Las Vegas bearpoppy in the southeastern portion of the LVW (PBS&J 2005).

Las Vegas bearpoppy and Merriam's bearpoppy are both short-lived, evergreen perennial herbs that are distinguished by a branched stem with yellow flowers in Las Vegas bearpoppy and by an unbranched stem with white flowers in Merriam's bearpoppy. In 2005, a survey was conducted to assess 100% of the Las Vegas bearpoppy habitat in the CTA study area. Because the survey occurred during the latter portion of the species' flowering periods, surveyors could not identify non-flowering bearpoppies to species. The survey resulted in a total count of 131,939 plants distributed across 496.5 acres of habitat. Bearpoppy species are known to produce relatively large amounts of long-lived seed, and populations can fluctuate drastically from year to year in response to winter precipitation. Because the survey was performed during a year of above-average rainfall, the survey results are believed to represent the potential distribution of the species within the CTA study area. Surveys conducted in 2005 (PBS&J 2005) and 2007 (USU 2007b) identified a combined total of 509.71 acres of known occupied bearpoppy habitat, or 3.7% of the CTA study area, along with 1,082.95 acres of high-potential and 1,174.11 acres of moderate-potential habitat (17% of the CTA study area). Like the Las Vegas Buckwheat, this species occurs primarily within the White Bursage–Shadscale Saltbush community but also occurs in adjacent communities in small percentages (Table 3.4-5). The distribution of known occupied and potential bearpoppy habitats in the CTA study area is presented in Figure 3.4-3. It should be noted that although potential habitat for this species reaches all the way to the northwest end of the CTA study area, few individuals have been observed west of the Decatur Boulevard alignment. Conversely, Janis Boettinger of the Department of Pedology at USU speculated that surface characteristics of the soils west of Decatur may preclude bearpoppy occurrence, although the mechanism is not fully understood (personal communication, Janis Boettinger, USU 2008).

Table 3.4-5. Occupied and Potential Habitat for Bearpoppy

Habitat Type—Soil Type	Habitat Type—Vegetation Community	Acres of Occupied Habitat per Soil-Vegetation Association	% Total Occupied Habitat	Acres of High-Potential Habitat per Soil-Vegetation Association* Soil Type	Acres of Moderate-Potential Habitat per Soil-Vegetation Association* Soil Type
Badland	White Bursage–Shadscale Saltbush	200.47	39%	201.89	0.23
Las Vegas gravelly, fine, sandy loam, 0%–2% slopes	White Bursage–Shadscale Saltbush	145.80	29%	276.26	0
Las Vegas–DeStazo complex, 0%–2% slopes	White Bursage–Shadscale Saltbush	90.61	18%	220.35	4.51
Weiser extremely gravelly, fine, sandy loam, 2%–8% slopes	White Bursage–Shadscale Saltbush	29.53	6%	57.84	0
Badland	White Bursage–Spiny Menodora	9.15	2%	31.70	0
Dalian-McCullough complex, 0%–4% slopes	White Bursage–Shadscale Saltbush	6.90	1%	28.20	0

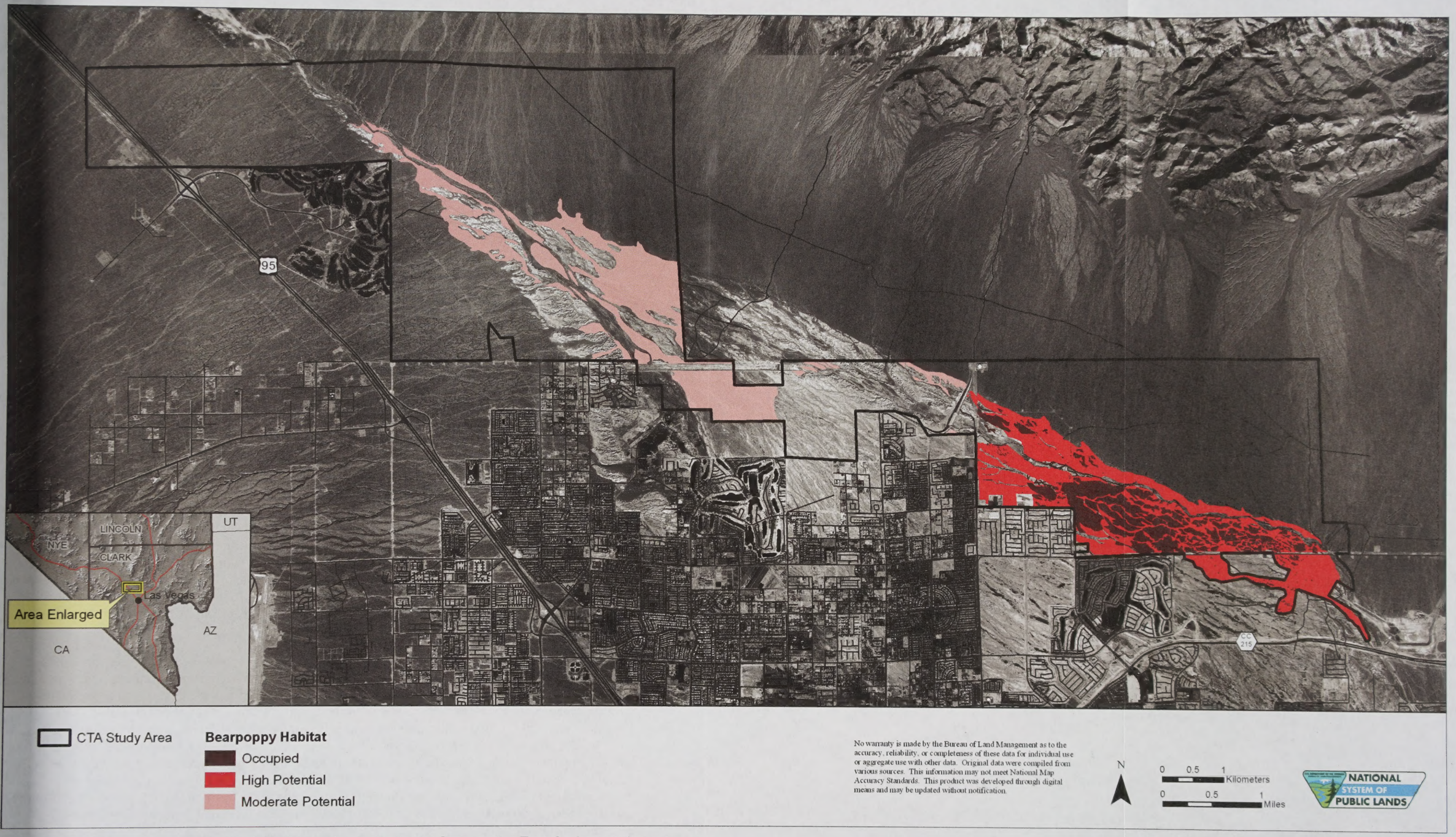
Table 3.4-5. Occupied and Potential Habitat for Bearpoppy (Continued)

Habitat Type—Soil Type	Habitat Type—Vegetation Community	Acres of Occupied Habitat per Soil-Vegetation Association	% Total Occupied Habitat	Acres of High-Potential Habitat per Soil-Vegetation Association* Soil Type	Acres of Moderate-Potential Habitat per Soil-Vegetation Association* Soil Type
Las Vegas gravelly, fine, sandy loam, 0%–2% slopes	White Bursage–Spiny Menodora	7.24	1%	45.70	0
Dalian-McCullough complex, 0%–4% slopes	Creosote Bush–White Bursage	7.53	1%	221.00	1,169.37
Las Vegas gravelly, fine, sandy loam, 0%–2% slopes	Human-modified lands	3.34	1%	0	0
Arizo very gravelly loamy sand, flooded, 0%–4% slopes	Badlands	0.50	<1%	0	0
Badland	Badlands	2.06	<1%	0	0
Las Vegas–DeStazo complex, 0%–2% slopes	Badlands	0.01	<1%	0	0
Arizo very gravelly loamy sand, flooded, 0%–4% slopes	White Bursage–Shadscale Saltbush	0.52	<1%	0	0
Las Vegas–DeStazo complex, 0%–2% slopes	White Bursage–Spiny Menodora	2.30	<1%	0	0
Weiser extremely gravelly, fine, sandy loam, 2%–8% slopes	White Bursage–Spiny Menodora	1.98	<1%	0	0
Badland	Cattle Saltbush–White Bursage	0.60	<1%	0	0
Dalian-McCullough complex, 0%–4% slopes	Cattle Saltbush–White Bursage	0.23	<1%	0	0
Las Vegas gravelly, fine, sandy loam, 0%–2% slopes	Cattle Saltbush–White Bursage	0.11	<1%	0	0
Arizo very gravelly loamy sand, flooded, 0%–4% slopes	Creosote Bush–White Bursage	0†	<1%	0	0
Badland	Creosote Bush–White Bursage	0.77	<1%	0	0
Las Vegas–DeStazo complex, 0%–2% slopes	Human-modified lands	0.06	<1%	0	0
Weiser extremely gravelly, fine, sandy loam, 2%–8% slopes	Human-modified lands	0.01	<1%	0	0
Total Habitat		**509.71**		**1,082.95**	**1,174.11**

Sources: NRCS (2007); USU (2007b).

* In accordance with the methodology, human-modified lands and habitat types <1% do not constitute potential habitat.

† The exact value is 0.001.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Bearpoppy Habitat
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No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.
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Figure 3.4-3. Known occupied and potential habitat for bearpoppy in the Conservation Transfer Area study area.

3.5 CULTURAL RESOURCES

3.5.1 Introduction

As part of the LVVDB FEIS, extensive work to identify and evaluate cultural resources was conducted by HRA, Inc. (HRA), for the BLM. The methods used during the identification efforts and the area of potential effect surveyed were established as the result of consultation between the BLM and the Nevada SHPO in accordance with the regulations set forth in 36 CFR 800. These regulations guide implementation of the National Historic Preservation Act of 1966, as amended. Identified cultural resources were then analyzed using the criteria in 36 CFR 60.4 to assess whether the cultural resources were eligible for the NRHP. BLM made determinations of eligibility for all identified cultural resources, and the Nevada SHPO concurred with all of the BLM's determinations. This documentation satisfied the identification phase of Section 106 of the NHPA and its implementing regulations at 36 CFR 800.

The Tule Springs archaeological site (26Ck247), which was listed in the NRHP in 1979, is located within the CTA study area on land owned by the BLM and the State of Nevada. Tule Springs will not change ownership or use as a result of this SEIS. Of the other properties located within the CTA study area, two have been determined eligible for the NRHP: Sites 26Ck6507 (the Tonopah Wagon Road) and 26Ck6910 (a prehistoric hearth and artifact scatter). Because these sites are located in an area of intense commercial and residential development, BLM has decided to mitigate impacts to both NRHP-eligible sites as an action independent of the purpose of and need for this SEIS. As part of the mitigation process, BLM contracted SWCA to prepare a Historic Properties Treatment Plan (HPTP) for mitigation of cultural resources in and adjacent to the CTA study area (Cannon et al. 2008). Mitigation efforts have been completed, and SWCA has prepared a draft report that details the results of the investigations. Ongoing tribal consultation is being conducted by BLM with support from SWCA.

3.5.2 Overview of the Prehistory and History of the Area

Land within the CTA study area has been used throughout prehistory and history. Prehistoric use of the area extends sporadically back to the Paleoindian period, but occupation evidence of the area is most commonly found to date to the past 1,500 years. Subsequent to Paleoindian occupation of the area, several cultural influences manifest themselves in the general region, including Anasazi, Patayan, and Numic traditions, among others. A substantial body of research has resulted in the production of a number of chronologies, many of which incorporate and summarize previous research (Blair and Wedding 2002; Blair et al. 1999; Ezzo 1995; Fowler and Madsen 1986; Lyneis 1982a, 1982b; Seddon and Ellis 2000; Seymour and Purcell 1995).

The Paleoindian period occupation of southeastern Nevada is not well defined because of the lack of substantial Paleoindian deposits; well-preserved, well-investigated occupations from this period are rare (Fowler and Madsen 1986:173). Indeed, some authors have posited a single Paleo-Archaic period that spans the years between 10,000 and 5500 B.C. (Roberts and Ahlstrom 2000; Woodman et al. 2001; Woodman et al. 2003). Paleoindian sites are generally surface finds of fluted points that suggest at least a short-lived Clovis-complex presence in some parts of southern Nevada. The association between artifacts and faunal remains at Tule Springs, located within the CTA study area, is unclear, and the Paleoindian age of this site has not been established beyond doubt (Fitzwater 1967; Harrington and Simpson 1961). To the east of the CTA study area, one fluted projectile point was identified in the LVW in Clark County Wetlands Park by Roberts and Ahlstrom (2000), but no additional cultural deposits were found in association with this artifact.

The earliest Archaic sites in the LVV date to the Pinto period, around 5000 B.C. However, few Pinto period sites or components have been identified, which may indicate decreased occupation of the area (Warren and Crabtree 1986). Several sites with Pinto components have been investigated in the LVV, including in the area of Tule Springs (Susia 1964). These sites are often limited to surface lithic scatters mixed with components of other periods. Excavated Middle Archaic sites have yielded few temporally diagnostic artifacts, but charcoal and ash deposits have provided radiocarbon dates for these deposits (Ahlstrom et al. 2004). Throughout the larger region, Late Archaic sites are more common than Middle Archaic sites, and a few are located within a few miles of the LVW.

Following the Archaic period is the Ceramic period, which spans the years from approximately A.D. 300 to 1500. In southeastern Nevada, three dominant agricultural groups are present: Anasazi (Ancestral Puebloan), Patayan, and Numic. It is difficult to discern the relationships and potential interactions between these groups, and such subjects have been a topic of recent research. Since ceramics are the only cultural indicator at many sites from this period in the area, it is uncertain whether they represent a Virgin Puebloan settlement or a trade network between the LVV inhabitants and established Puebloan settlements in the Moapa Valley. One of the sites in the CTA study area, 26Ck6910, has a ceramic assemblage, a scatter of fire-affected rock, and a single piece of lithic debitage; this site appears to have good potential to provide data on cultural affiliation and interaction (Ahlstrom et al. 2004:115).

Cultural features associated with the Patayan tradition include what have been called "intaglios," "earth figures," or "geoglyphs" (Seymour 1999:18). These consist of areas where removal of desert pavement creates shapes and figures (Ezzo 1995:64). One of the few known intaglios in Nevada is the LVW Intaglio Site, 26Ck4509, which is eligible for the NRHP under Criteria A, C, and D (Woodman and Valentine 1999). Stone alignments and rock rings may also be indicative of Patayan use of the region (Ezzo 1995:64–65). Patayan ceramics are often found mixed with Virgin Puebloan wares and increase in frequency near the end of the period as the Puebloan assemblage declines in frequency (Ahlstrom et al. 2004). This led Seymour (1997) to conclude that Patayan and Anasazi groups repeatedly used the same sites over long periods of time. Sites excavated as part of mitigation efforts for the Harry Allen to Mead Project include Early and Late Ceramic period sites, as well as a number of fragile pattern sites for which no definite dates could be determined (Gilreath et al. 2007).

For the LVV, the date of 1600 is considered the time when indirect influences from the Spanish of New Mexico began to reach the area. Direct contact between Southern Paiutes and Euro-Americans in southern Nevada did not occur until late in the eighteenth century. Prior to substantial permanent settlement by Euro-Americans in the LVV, parties traveled through the area en route to other places. The first travelers to traverse portions of what is now known as the old Spanish Trail were part of the Dominguez and Escalante party, although Francisco Garcés was the first to cover the Mojave segment (Myhrer et al. 1990:10). The two routes blazed by Dominguez and Escalante and by Garcés were later connected by Jedediah Smith in 1826 (Myhrer et al. 1990:10), and this route was reinforced by Antonio Armijo, who was the first to take a commercial caravan along the route (McBride and Rolf 2001:§8, p. 1). The route immediately became a major component of the trade network between the West Coast and the interior of the continent. A number of subsequent travelers followed these expeditions.

Captain John C. Frémont was one of the later travelers to cross southern Nevada, opening up the "Old Spanish Trail" in 1844, but he was one of the first to travel from west to east through the LVV (Myhrer et al. 1990:10), and his was the first expedition to give the name "Spanish Trail" to the route (McBride and Rolf 2001:§7, p. 1). With the publication of Frémont's notes and maps in 1845, this route began being used by many travelers through the area (McBride and Rolf 2001:§7; Myhrer et al. 1990:69). This route was replaced in 1848 by routes to the north and south for travel between Santa Fe and San Gabriel (Myhrer et al. 1990). However, the Old Spanish Trail route was later merged into the Mormon Road for the portion between south-central Utah and San Bernardino, California, which facilitated migration to

California (Myhrer et al. 1990). Segments of this trail are listed in the NRHP, and it is significant under the Transportation Research Theme and the Exploration and Settlement Sub-theme in the Nevada state context (McBride and Rolf 2001:§8, p. 1).

Sustained contact between Native American groups and Euro-Americans did not occur until well into the nineteenth century. The first Euro-Americans to permanently settle in southern Nevada were members of the Church of Jesus Christ of Latter-Day Saints (Mormons), whose goal, in part, was the establishment of a route between Salt Lake City and southern California. Their initial settlement in the area was in Las Vegas, southeast of the CTA study area (Tingley 1992).

As the Mormon settlements grew, they developed irrigation networks for farming the land. They soon concluded, however, that the area was covered with alkaline soils and was not suitable for large-scale farming. By 1857, most of the Mormon settlers had headed back to Utah; by the end of that year, southeastern Nevada had become largely depopulated of Euro-Americans. This changed with the Homestead Act of 1862 and the formation of the Nevada Territory in 1864, which attracted new settlers to the territory with the promise of 160-acre allotments to settlers, with full ownership bestowed after five years' residency on the land (Milner 1994:153). The Homestead Act had far-reaching effects, since it allowed immigrants with even modest incomes to aspire to become part of the "American Dream," and it pushed the nation's frontier ever westward. Traces of this westward movement are still visible on the landscape today as wagon trails, such as Site 26Ck6507, a historic segment of road that extends north from the Paiute Reservation (Ahlstrom et al. 2004:170). This road carried people and materials to the gold fields north of Las Vegas until it was supplanted by the railroad (Ahlstrom et al. 2004:170).

With the Homestead Act, southeastern Nevada was once again populated, and agricultural activities soon became the main economic activity of the LVV. The community became a major supply stop on the now-well-traveled Mormon Trail. However, despite the community's new focus on agriculture and its recovered role as an important travelers' way station, Las Vegas remained a generally small and quiet settlement until the arrival of the railroad. By the beginning of the new century, the American West had become increasingly urbanized, including population expansion throughout the LVV. The advent of the railroad significantly shortened travel time between Las Vegas and Salt Lake City, Los Angeles, and San Diego (Ahlstrom et al. 2004:64). The Las Vegas and Tonopah Railroad (LV&TR) was built to connect Las Vegas with newly discovered gold sources in Bullfrog and Rhyolite and to extend rail service to Tonopah (Ahlstrom et al. 2004:64). Unfortunately, the line was in use for only a limited time, and the LV&TR line went out of business by 1918 (Ahlstrom et al. 2004:654). One of the sites near the CTA study area is related to the LV&TR—26Ck5596, the LV&TR camp and siding (Ahlstrom et al. 2004:150).

During World War I, southeastern Nevada remained primarily a central railroad stop and cargo depot on the way to and from the northern Nevada mining camps. The signing of the Colorado River Compact in 1922 resulted in an annual grant of 300,000 acre-feet per year (AFY) of previously untapped water to Nevada and set in motion the activities necessary to bring the water from the Colorado River to the southeastern part of the state (Hulse 1991:192–193). This, along with the federal government's proposal to construct the Boulder-Hoover Dam, led to a thriving Las Vegas during the 1920s, although this prosperity was diminished during the Great Depression. The dam began impounding water in 1935, and all the major transmission lines were completed by the end of the 1930s. People working to build the dam and at other industrial enterprises created squatter settlements throughout the LVW area, as well as in the surrounding mountains. Among the sites identified within the LVW are the remains of some of these squatter settlements.

During the World War II era, new developments came to the LVV. The Las Vegas Valley Army Gunnery School was one of the major new developments and was the first aerial gunnery school established in the

U.S. (Ahlstrom et al. 2004:123). This gunnery range was originally identified in 1991 as Site 26Ck4803 and was rerecorded by HRA during the survey for the LVVDB FEIS (Ahlstrom et al. 2004:123). An additional historical site, 26Ck6351, is most likely the command and control facility for the Moving Target Range of the Las Vegas Valley Army Gunnery School; this site was also rerecorded by HRA during the LVVDB FEIS survey (Ahlstrom et al. 2004:154).

3.5.3 Identification of Cultural Resources

Identification of the cultural resources within the CTA study area was conducted in 2003 and 2004 by HRA for the area of the entire LVVDB, as initially defined (Ahlstrom et al. 2004). As a result of this documentation, two sites located within the CTA study area were determined by the BLM to be NRHP eligible; SHPO has concurred with these determinations. Of these sites, one dates to the Historic period and one is prehistoric (Table 3.5-1). Because of development pressures in the surrounding areas, BLM has decided to mitigate the two NRHP-eligible sites independent of the currently Proposed Action (Cannon et al. 2008). An HPTP (Cannon et al. 2008) has been prepared by SWCA in coordination with BLM and SHPO. BLM has approved the document, and it has been revised based on comments from SHPO; the HPTP has been approved by SHPO. One additional resource, Tule Springs (26Ck247), is also within the CTA study area. This site is on land owned by BLM and the State of Nevada and is listed in the NRHP. Tule Springs will not change ownership or use as a result of this SEIS. The site has contributed substantially to our understanding of paleoenvironments. This site was listed in the NRHP in 1979 because of its importance in understanding paleoenvironments and because of its association with significant advances in archaeological methods and analysis. The Tule Springs site will not change ownership or use as a result of this SEIS.

Table 3.5-1. Sites Eligible for or Listed in the National Register of Historic Places

Site No.	Period	Site Type	NRHP Criterion
26Ck247	Prehistoric/ Paleontological	Prehistoric artifact scatter with features and paleontological locality.	Listed 1979
26Ck6507	Historic	Wagon Road from Tonopah to Las Vegas.	A
26Ck6910	Prehistoric	Hearth feature with ceramics and lithics.	D

3.5.4 Ethnographic Issues, Traditional Cultural Properties, and Native American Religious Concerns

The area in and around the CTA study area represents a cultural landscape of great significance to the Southern Paiute people (Stoffle et al. 2004). The concept of a cultural landscape encompasses the categories of ethnographic issues, TCPs, and Native American religious concerns, as the landscape is considered to be inextricably linked to the spirituality of the Paiute people. Representatives of the Las Vegas Paiute Tribe have described places such as the landscape in the area of the LVW as places of peace for connecting with the past. This view contrasts with Western cultural views of places such as the LVW as sites for urbanization and recreation.

As noted in Section 3.5.1, "Introduction," tribal consultation regarding TCPs and related religious concerns is currently underway. Tribal representatives have shared their views with BLM and SWCA that the entire LVW in and of itself represents an important cultural landscape and potential TCP for the Las Vegas Paiute Tribe and other tribal communities in the area, such as the Chemehuevi and Moapa Paiute. A TCP is considered a property or site that is eligible for inclusion in the NRHP because of its association

with cultural practices or beliefs of a living community, that are rooted in that community's history, and that are important to preserving the cultural identity of that community. Tribal communities have stressed that the aboriginal homeland includes both the washes and the surrounding area: the whole of the landscape has cultural and religious importance to the Paiute people. Regional areas of significance also include the Ivanpah Valley, Gypsum Cave, and Middle Kyle Canyon. In the ongoing assessment of cultural and religious concerns, the Las Vegas Paiute Tribe noted that they do not want to identify locations of specific sites of importance, since they do not want them to be intentionally disturbed if the locations become known to the public. The entire landscape should be considered in the assessment of impacts.

In addition to landscape concerns, other TCPs and religious concerns identified in meetings with tribal members include migratory trails and washes because of the traditional practice of interring the dead in the washes. Disturbance to washes could result in the disturbance of the dead, which has both cultural and religious implications. The tribes are connected to the LVW both spiritually as well as physically. The LVW is part of the Salt Song Trail, which although it is not a physical trail does include geographical places. Salt Song singers "sing" the spirits of the dead home along the Salt Song Trail. The singers' voices accompany the spirits on their journey. This is not a physical migration along the trail. The trail may vary according to singer, song, or band.

Numerous ethnographic studies and publications and ethnohistorical accounts attest to the cultural and religious significance of the regional landscape, landforms, and natural features, as well as archaeological sites (e.g., Euler and Fowler 1966, 1973; Fowler 1989, 1992; Fowler and Fowler 1971; Stoffle and Arnold 2003; Stoffle and Zedeño 2001; Stoffle et al. 2002; Stoffle et al. 2004). Of particular relevance to the ethnographic concerns of the CTA study area is the recent study *Puha Flows from It: The Cultural Landscape Study of the Spring Mountains* (Stoffle et al. 2004). This study of Southern Paiute cultural landscapes provides a basis for evaluating alternatives and developing treatment plans. For example, the authors note,

> Landscapes are recognized as needing different types of management based on what they contain. So a mountain range may have hot springs, above-timberline vistas, obsidian outcrops, caves, and patches of medicine plants. Each has its own value and together they make up the cultural landscape for a traditional people. Each feature of this landscape can have different management responses based on the needs of the federal agency and the culture of the appropriate people. (Stoffle et al. 2004:179)

BLM is proceeding with tribal consultation with the Southern Paiute people regarding the CTA study area, focusing on the identified landscape-based cultural and religious concerns.

3.6 PALEONTOLOGICAL RESOURCES

Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms that have been preserved in rocks and sediments. These include mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains. Fossils are considered non-renewable resources because the organisms they represent no longer exist. Thus, once destroyed, a fossil can never be replaced.

Paleontological resources represent a critical resource concern within the CTA study area. Researchers have recorded 436 paleontological localities within the CTA study area, and two localities occur just outside it. All these localities occur in sedimentary deposits of the late Pleistocene age LVF. BLM has

identified four objectives for the management and conservation of paleontological resources within the CTA:

1. To maintain the integrity of the paleontological assemblages within the study area, including geological stratigraphy, by configuring the CTA boundary to include all major fossil localities, and to work within BLM's statutes to protect the LVF within all approved R&PP Act leases.
2. To establish in situ paleontological preservation areas that are kept undisturbed and unfragmented.
3. To maintain in situ key paleontological localities, including paleosols, that are essential to understanding the paleoecology of the LVF.
4. To provide for the mitigation and treatment of all paleontological localities, including those that can be preserved in situ.

The information presented here builds on the SBCM *Paleontological Resources Assessment and Treatment Plan—Las Vegas Valley Disposal Boundary EIS, Las Vegas, Nevada* (Paleontology Plan) (SBCM 2004), prepared as part of the LVVDB FEIS (BLM 2004a). The following section discusses the geological units within the CTA study area. The sensitivities of these geological units are ranked according to the BLM Conditions in the *Paleontology Resources Management Manual and Handbook* (H-8270-1) (BLM 1998b) and the Potential Fossil Yield Classification (PFYC) (U.S. Forest Service [USFS] 1996), which the BLM is currently considering adopting as policy (Appendices D and E).

3.6.1 Geology and Paleontology

The CTA study area is located within the LVV, which is a 600-square-mile basin bounded by Spring Mountains to the west, Sheep Mountains to the north, Muddy Mountains, Eldorado Range, and Lake Mead to the east, and Black Mountains to the south. The LVV is structurally characterized by a northwest-trending, down-dropped, wedge-shaped fracture zone that transects the folds and thrust faults of the mountains on either side (Longwell 1960). The floor of the LVV consists of the alluvial silt, sand, gravel, and lacustrine mudstone beds of the LVF interfingered with alluvial fan sediments derived from the Paleozoic limestone beds of the Spring Mountains to the southwest and the Las Vegas and Sheep ranges to the northeast (Haynes 1967). The north end of the valley is drained by the Corn Creek and Tule Springs washes, which eventually terminate in a distributary flat. At its south end, the valley is drained by LVW, which extends eastward between Frenchman and River mountains and drains into the Colorado River at Lake Mead.

According to the geological mapping of Longwell et al. (1965), and as supported by geological and paleontological data collected by the SBCM (2004), the CTA study area is almost entirely directly underlain by the highly paleontologically sensitive late Pleistocene age LVF. Portions of the study area may also be directly underlain by thin deposits of late Quaternary (latest Pleistocene to Holocene) younger alluvium with low paleontological sensitivity (Figure 3.6-1).

Las Vegas Formation

The LVF (Ql in Figure 3.6-1), which is exposed in several large areas along the length of the LVV, comprises a series of light-colored clay and silt deposits that often occur in thin, horizontal layers (Longwell 1946; Longwell et al. 1965). Exposures of the LVF have yielded numerous scientifically important fossil localities that have produced the most scientifically significant assemblages of late Pleistocene vertebrate fossils known from the Mojave Desert (SBCM 2004).

Based on stratigraphic study of the Tule Springs area, Haynes (1967) divided the LVF into seven units, A through G, which were then further subdivided; subscript numerals designate these subdivisions. A_1 is the oldest and stratigraphically lowest unit, and G_2 is the youngest and stratigraphically highest unit. Of the seven units, B_2, C, D, and E_1 have proven fossiliferous. Additionally, Haynes (1967) identified six interbedded soil horizons, S_1 through S_6. Although alternatives to these subdivisions of the LVF have been proposed (e.g., Donovan 1996), Haynes's stratigraphy has proven to be the most useful for describing temporally contemporaneous fossil assemblages and distinguishing between temporally discontinuous depositional episodes and has been adopted in recent paleontological research (SBCM 2004; Springer et al. 2006).

Units A and B consist mostly of light brown, fluvially deposited silt and gravel and are only sparsely fossiliferous, based on studies undertaken thus far. Unit B_2, however, contains pale green mudstone beds that have produced aquatic mollusks and large, vertebrate fossils, including mammoth, horse, and camel (Mawby 1967; Quade 1986; Springer et al. 2006). Although both Units A and B are too old to be dated using ^{14}C isotopic analysis, Quade et al. (2003) noted that Unit B_2 has been tentatively correlated with the 190,000 to 140,000 thousand years before present (ybp) deep lake episode in Death Valley and with the 186,000 to 130,000 ybp isotope Stage 6 at Devils Hole.

Unit C consists of light brown, calcareous silt and gravel with some localized bedded sand deposits. Unit C was likely fluvially deposited during a relatively dry period between the relatively wet periods of deposition represented by Units B and D. Fossils have recently been discovered within Unit C (personal communication, Kathleen Springer 2007). These have not been dated.

Of the seven LVF units (Haynes 1967), Unit D is generally the most widespread and best exposed in the CTA study area. It is highly fossiliferous and known to produce Pleistocene megafaunal and microfaunal vertebrates, in addition to abundant freshwater mollusks (Haynes 1967; Quade 1986; Quade and Pratt 1989; Reynolds et al. 1991; Springer et al. 2006). Toward the center of the LVV, Unit D comprises calcareous green mudstone with abundant secondary carbonate; it contains mollusk remains. Along the margins of the LVV, the fluvial bedforms of Unit D contain fossil cicada burrows but lack aquatic mollusks. Scattered vertebrate megafaunal remains have eroded from Unit D along the valley margins (Quade 1986).

Haynes (1967) dated the base of Unit D to 31,300 ± 2,500 ybp and the middle of the unit to 22,600 ± 550 ybp using ^{14}C from fossil gastropod shells collected from near Tule Springs. However, these dates may be too old because of isotopic fractionation and an initial ^{14}C deficiency in the water (Haynes 1967). Subsequently, carbonized wood collected from near the base of Unit D provided a radiocarbon date of 25,300 ± 2,500 ybp (SBCM 2006). Although the depositional environment of Unit D has been widely debated, Quade et al. (2003) hypothesized that the sediments of Unit D, as well as those of Units B_2 and E_1, were deposited as the result of spring discharge. Springer et al. (2006) suggested that the discharge features of these units can be correlated with late Quaternary climatic changes in the region.

At Tule Springs, Unit E is characterized by spring and channel deposits comprising cross-bedded alluvium, localized green clay, and organic horizons and tufa (Haynes 1967; Quade 1986). These channel deposits have produced locally abundant mammalian megafaunal remains, including mammoth, horse, and camel. Freshwater mollusks have also been recovered (Quade 1986; Springer et al. 2006). Carbonized wood fragments from near the base of Unit E have been radiocarbon dated at 14,040 ± 320 ybp. The youngest radiocarbon date obtained from Unit E is 9,370 ± 210 ybp (Quade 1986).

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Figure 3.6-1. Geology of the Las Vegas Formation.

As stated earlier, the LVF contains locally abundant and highly diverse assemblages of fossil vertebrates, mollusks, and ichnofossils that represent both extinct and extant taxa. It is considered highly sensitive under BLM paleontological resource management guidelines (BLM Condition 1, PFYC Class 5) and as reported in the Paleontology Plan (SBCM 2004) and the LVVDB FEIS (BLM 2004a). Specifically, the LVF fauna includes remains of fossil amphibians, such as frogs and toads; reptiles, such as lizards, snakes, and tortoise; birds, including ducks, coots, owls, hawks, and teratorns (an extinct, giant condor–like bird); and a diverse assemblage of mammals. The fossil mammals include small-bodied forms, such as cottontail rabbit, jack rabbit, ground squirrel, marmot, pocket gopher, kangaroo rat, pocket mouse, deer mouse, wood rat, meadow vole, muskrat, badger, and coyote; and large-bodied forms, including possible mountain lion, possible lynx or jaguarundi, North American lion, two species of horse, camel, deer, pronghorn antelope, bison, two species of ground sloth, and Columbian mammoth. Additionally, mollusks, including 11 species of freshwater snails, nine species of land snails, and two species of freshwater clams; cicada burrows; and unidentifiable plant remains are locally preserved (Mawby 1967; Quade 1986; Reynolds et al. 1991; Scott and Cox 2002; Simpson 1933; Springer et al. 2006).

Ongoing paleontological work in the Tule Springs–LVW area by SBCM researchers is providing a picture of the fauna, taphonomy, paleoecology, and paleoenvironments of the Mojave Desert ecoregion during the late Pleistocene. Additionally, it is greatly increasing our understanding of the detailed stratigraphy and depositional environments of the LVF. In addition to the scientific significance of these paleontological resources, the long-term management and preservation of fossils within the CTA study area provide important opportunities for community involvement and education. Ongoing studies will refine the spatial distribution of fossil locations.

Younger Alluvium

Thin layers of late Quaternary younger alluvium (latest Pleistocene to Holocene in age) (Qal in Figure 3.6-1) overlie portions of the LVF within and around the CTA study area. While latest Pleistocene age alluvium has the potential to contain vertebrate fossils, Holocene age alluvium contains only the remains of modern species and is too young to contain fossils. Because no recorded fossil localities are documented within younger alluvium in or near the CTA study area, younger alluvium is considered to have low paleontological sensitivity (BLM Condition 3, PFYC Class 2) within the CTA. As shown in Figure 3.6-1, there are numerous fossil localities that appear in the younger alluvium. Because of the dynamic nature of the wash, the younger alluvium covering the LVF is inconsistent in thickness and varies throughout the area. The fossil localities recorded have all been documented as having been eroded from the LVF.

Ongoing geological mapping of Pleistocene sediments will refine spatial distribution.

3.6.2 Paleontological Records Search

In support of this analysis, paleontological locality and specimen data were obtained from the Regional Paleontological Locality Inventory at the SBCM. Researchers recorded 436 fossil localities within the current CTA study area during the field survey for the Paleontology Plan (SBCM 2004), prepared as part of the LVVDB FEIS. In order to illustrate their geographical distribution throughout the CTA study area, the approximate locations of the fossil localities are shown in Figure 3.6-1. Based on the large number of recorded fossil localities, locally abundant fossils, and highly diverse vertebrate fossil assemblages, the LVF is considered to have high paleontological sensitivity (Table 3.6-1). Because no fossils have been discovered in deposits of younger alluvium within or near the CTA study area, younger alluvium is considered to have low paleontological sensitivity.

Table 3.6-1. BLM and USFS Paleontological Sensitivity Classifications of Geological Units in the CTA Study Area*

Geological Unit	Age	Known Fossils	Sensitivity	BLM Condition	PFYC Class
Las Vegas Formation	Late Pleistocene	Diverse assemblages of amphibians, reptiles, birds, mammals; less diverse mollusks, plants, and ichnofossils.	High	1	5
Younger Alluvium	Latest Pleistocene to Holocene	None recorded in latest Pleistocene age alluvium in the CTA study area; Holocene age deposits are too young to contain fossil remains.	Low	3	2

* See Appendices D and E for details of the BLM Conditions (BLM 1998b) and USFS PFYC (USFS 1996), respectively.

3.7 VISUAL RESOURCES

Visual resources (the landscape) consist of land forms (topography and soils), vegetation, bodies of water (lakes, streams, and rivers), and human-made structures (roads, buildings and other structures, and modifications of the land, vegetation, and water). These elements of the landscape can be described in terms of form, line, color, and texture. Usually, the more variety of these elements a landscape has, the more interesting or scenic the landscape becomes if the elements co-exist harmoniously. The BLM manages landscapes that require varying levels of protection and modification, giving consideration to the uses and values of other resources and the scenic quality of the landscape.

3.7.1 Existing Visual Conditions

Area of Influence

The CTA study area is located at the upper end of the LVV, which is in the Great Basin region of the Basin and Range Physiographic Province. The LVV is an intermountain valley, generally surrounded by north-south-trending mountain ranges. The LVV is bordered to the north by the Las Vegas and Sheep ranges, to the east by the Frenchman and River mountains, to the south by the McCullough and Bird Spring ranges, and to the west by the Spring Mountains. Generally, these mountain ranges rise between 1,500 and 7,000 feet above the valley floor, except for the portion of Spring Mountains that is at Mount Charleston, which rises to 12,000 feet.

The LVV is generally flat, sloping to the southeast at a grade of less than 1%. The valley floor is formed by a series of coalescing alluvial fans and drainages. The LVW and its tributaries form the active drainage system in the LVV, discharging into Lake Mead south of the Frenchman Mountains.

Much of the LVV has been modified by the growth and development of the Las Vegas metropolitan area, surrounding communities, and Nellis Air Force Base. Typical viewpoints of the valley are from U.S. Highways 93 and 95, Interstates 15, 215, and 515, and numerous state highways crossing the valley and adjacent mountain ranges and from adjacent recreation and natural areas, including Red Rock Canyon NCA, Sloan Canyon NCA, Toiyabe National Forest, DNWR, Lake Mead National Recreation Area (NRA), Sunrise Mountain Natural Area, and others.

Upper Las Vegas Wash Conservation Transfer Area

The CTA study area lies in the northern portion of the LVV. The CTA study area is characterized by the floodplain of the ULVW and the adjacent alluvial fans (bajadas), which slope gently from the nearby mountain ranges to the wash.

Vegetation in the CTA study area is typical of the lower elevations of the Mojave Desert and includes Mojave creosote bush scrub, desert saltbush scrub, and Mojave wash scrub vegetation communities. Common plants in the Mojave creosote bush scrub community include creosote bush, white bursage, and cactus and yucca species. Common plants in the desert saltbush scrub community include cattle saltbush and fourwing saltbush. The Mojave wash scrub community is found along washes and arroyos and commonly includes catclaw acacia and desert willow (*Chilopsis linearis*). This community is often mixed with the creosote bush scrub community. Generally, the vegetation is continuous across the CTA study area, widely spaced, and 2 to 8 feet tall.

Common riparian vegetation found along the ULVW includes desert willow, mesquite, cottonwood (*Populus fremontii*), and saltcedar. Because of the presence of water, vegetation along the wash is taller (2–30 feet tall) and more dense.

There are no permanent bodies of water present in the CTA study area. The CTA study area, however, is drained by the ULVW and Range Wash, two ephemeral washes that typically flow only after substantial rainfall events. Following these infrequent events, water may pool for short periods (from a few days to a couple of weeks) behind the Decatur detention basin, which is located within the ULVW in the CTA study area.

The landscape of the CTA study area has remained largely unmodified by human development; however, roads, power lines, and flood control structures have altered parts of the CTA study area. Most of the development is near the ULVW, particularly to the south of the wash. In the southeastern portion of the CTA study area, two power lines enter the property from the east, following the Grand Teton Road alignment. A 230-kV power line follows the Grand Teton Road alignment west to Decatur Boulevard. There, the line turns north, following Decatur Boulevard to the Moccasin Road alignment. At that intersection, the 230-kV line turns west and follows Moccasin Road until it leaves the CTA study area and crosses U.S. Highway 95. A 500-kV power line parallels the 230-kV line for a short distance along the Grand Teton Road alignment in the southeastern part of the CTA study area; it then branches northwest across the CTA study area, roughly following the ULVW to the Moccasin Road alignment. There, the 500-kV line also follows Moccasin Road west across the southern edge of the CTA study area, leaving the CTA study area just east of U.S. Highway 95.

The Grand Teton Road alignment (an east-west dirt road) crosses the southeastern portion of the CTA study area near the Eglington Preserve. Grand Teton Road is currently under construction to become a paved road. The Decatur Boulevard alignment (a north-south dirt road) crosses the central part of the CTA study area and intersects the Moccasin Road alignment. South of this intersection is the Decatur detention basin in the ULVW. Also in this location, the City of North Las Vegas has constructed a large water-storage tank (about 20 feet tall × 50 feet in diameter) surrounded by a brick wall. A second storage tank is under construction.

A concrete levy has been constructed in the wash upstream of the Decatur detention basin to protect residential areas south of the wash.

While some parts of the CTA study area have been modified by the above-described activities, the southeastern portion of the CTA study area—north of the ULVW and 500-kV power line—is undeveloped. The northwestern part of the CTA study area—west of the Clark County Shooting Park and north of Moccasin Road—is undeveloped. South and west of the LVW, a 7.2-kV transmission line crosses the CTA study area in a southeast-northwest direction. The lands to the northeast—between the 7.2-kV transmission line/LVW and DNWR—are undeveloped. In the background, the wildlife refuge enhances the sense of a large, natural, undeveloped landscape for visitors looking north into the CTA study area. As shown in Figure 3.8-1, U.S. Highway 95 crosses the extreme western portion of the CTA study area north of the Paiute Reservation.

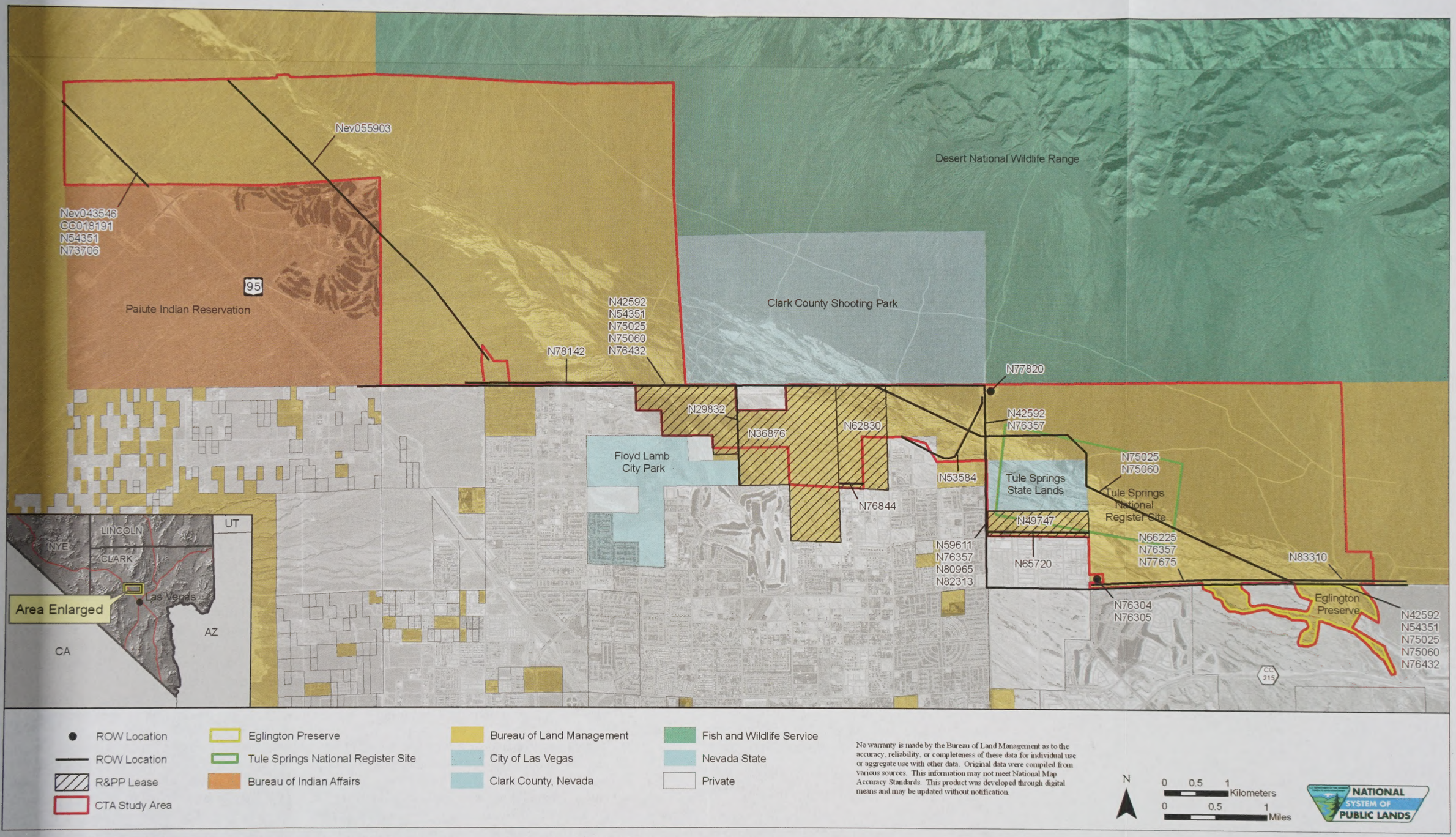

Figure 3.8-1. Existing rights-of-way and Recreation and Public Purposes Act leases in the Conservation Transfer Area study area.

3.7.2 Bureau of Land Management Direction

BLM sets objectives for management of landscape preservation and change through its land use planning process. All lands are placed into one of four classes, Classes I through IV. These classes identify the degree of acceptable landscape change, or alteration, giving consideration to the scenic value of the landscape and other resource values and uses of the land. Class I objectives are established in areas in which no landscape change is desired. Class IV objectives are set for landscapes that BLM manages for uses that will result in substantial landscape changes (e.g., mining, energy development, wind farms). Classes II and III allow for degrees of landscape preservation and change that are between those of Classes I and IV.

The VRM class objectives for the CTA study area were established in the Las Vegas RMP (BLM 1998a). All the lands in the CTA study area have been allocated to VRM Class III management objectives. The objective of Class III is to partially retain the existing character of the landscape. The level of change to the landscape can be moderate, and management activities may attract attention but should not dominate the view. Changes in the landscape should repeat the basic elements found in the predominant natural features of the characteristic landscape.

3.8 LAND USE

3.8.1 Land Ownership

Clark County covers 5.12 million acres of land, approximately 90% of which is under the administration and control of six federal agencies. BLM manages the majority (57%, or 2.9 million acres) of the federal land; National Park Service (NPS), USFWS, USFS, Bureau of Reclamation, and U.S. Air Force manage the other 33%. State and local governments and private and commercial owners hold the remaining 10%, or fewer than 500,000 acres, of land in Clark County. Lands within the CTA study area are BLM administered, with the exception of the State-managed Tule Springs National Register Site. Ownership and administration of the lands surrounding the CTA study area include federal (BLM and USFWS), state, and city governments, as well as private interests and tribal lands.

3.8.2 Land Use Planning

The LVV includes 13 community planning areas that have set goals and policies to guide future land use and development throughout the LVV. In the incorporated areas, land use planning decisions are created and approved by the Cities of North Las Vegas, Las Vegas, and Henderson. The town advisory boards of unincorporated areas of Clark County draft plans that are reviewed and approved by the Board of County Commissioners for incorporation into the *Clark County Comprehensive Master Plan* (Clark County 2001). CCRFCD guides planning in flood hazard areas throughout the LVV. The *Clark County Master Plan Update* (Clark County 2002) identifies the type and location of proposed flood control facilities.

The *City of Las Vegas Master Plan 2020* (City of Las Vegas 2006c) describes a vision of a recreation corridor and neighborhood park system along the LVW. Features such as paved walkways, play and picnic areas, landscaping, and restrooms are planned for the corridor. The Las Vegas Wash Trail would ultimately extend for approximately 20 miles and cross the CTA study area, stretching from Floyd Lamb Park to Lake Mead NRA.

Land use categories (or classifications) are generally determined by the local governments that have jurisdiction over the land. These categories are tools that provide a standard language in the community

planning process to derive a land use plan. Clark County has 20 land use categories. The majority of the BLM-managed lands within the CTA study area fall within a community land use plan. For transportation planning, the Regional Transportation Commission of Southern Nevada (RTC) uses 27 planned development land use categories within these planning areas (RTC 2002). These land use categories were regrouped into nine land development or end-use groups, as follows:

- Single-family housing
- Multi-family housing
- Office buildings
- Retail space
- Hotels and casinos
- Light industry
- Religious facilities
- Public facilities
- Recreation and open space

3.8.3 Current Land Uses

The majority of BLM-administered lands in the CTA study area are vacant. Some of these lands are encumbered by ROWs, leases, permits, or mining claims. Other public lands in the CTA study area are leased for recreation and other public purposes under the R&PP Act.

A ROW allows the use of a specific piece of public land for specific facilities and for a specific period. The majority of the ROWs are authorized under Title V of the FLPMA, as amended, for structures, pipelines, and facilities to store and transport water, sewer, electrical, and communications systems; for flood control facilities; and for highways, roads, railroads, and other means of transportation. Other ROWs are also issued for natural gas pipelines under the MLA, as amended. BLM also grants ROWs to the Nevada Department of Transportation (NDOT) for mineral material sites that provide sand and gravel for road maintenance and construction. The BLM objective for ROW management is to meet public demand and reduce impacts to sensitive resources by providing an orderly system of development for linear projects and related facilities.

Recognizing the strong public need for a nationwide system of parks and other recreation and public purpose areas, in 1926 Congress enacted the R&PP Act, as amended [43 CFR 2740.03]. The R&PP Act authorizes the lease or conveyance of public lands (not including a $100 filing fee) for recreation uses by government entities or at reduced cost for public purposes to state and local governments and qualified non-profit organizations. Leases and patents granted under the R&PP Act require that the land continue to be used for the stated purpose. Counties, cities, and other political subdivisions of a state and nonprofit organizations may purchase up to 6,400 acres a year for recreation purposes and an additional 640 acres for other public purposes. Common R&PP Act leases include parks, community centers, schools, libraries, fire stations, public golf courses, law enforcement facilities, flood control detention basins, and sewage treatment facilities. The average lease size is 15 to 40 acres, with larger regional parks averaging 100 acres or more.

Government land records, such as master title plats, were reviewed to determine existing authorized uses of the public lands in the CTA study area. Table 3.8-1 provides a list of existing ROWs and R&PP Act leases, with a brief description of each authorization, while Figure 3.8-1 depicts these land uses. Table 3.8-2 provides a list of pending ROWs and leases for proposed uses of the CTA study area. There are no expired ROWs or leases that are planned for reauthorization. As part of the LVVDB, lands in the CTA study area have been withdrawn from entry under the public land and minerals laws. There is no livestock grazing in the CTA study area.

Table 3.8-1. Existing Authorized Uses in the Upper Las Vegas Wash CTA Study Area

Serial No.	Description	Legal Description (Township, Range, Section)
Nev-043546	Transmission line ROW, 100 feet, Nevada Energy (NV Energy)	T18S, R59E, S22
CC-018191	U.S. Highway 95 ROW, 400 feet, NDOT	T18S, R59E, S22
N-54351	Fiber-optic line, 20 feet, U.S. Air Force	T18S, R59E, S22 T19S, R61E, S15, 16
N-73706	Fiber-optic facilities ROW, 20 feet, consolidates N-59276 and CC-021488, Nevada Bell	T18S, R59E, S22
Nev-055903	Transmission line ROW, 100 feet, NV Energy	T18S, R59E, S23, 24
Nev-055903	Transmission line ROW, 60 feet, NV Energy	T18S, R60E, S30–32
N-78142	Moccasin Road between Ft. Apache/Durango, sewer, and drainage ROW, varying width, City of Las Vegas	T18S, R60E, S31–33
N-83860	Road, drainage, sewage and streetscapes ROW, Kyle Canyon Gateway area	T18S, R60E, S31, 32
N-83860-01	Short-term construction area for road, drainage and sewage ROW, Kyle Canyon Gateway area	T18S, R60E, S31
N-53584	Decatur detention basin ROW, City of North Las Vegas	T19S, R60E, S1
N-76357	Decatur Boulevard and Aliante Parkway road, water, sewer, and drainage ROW, varying width, City of North Las Vegas	T19S, R60E, S1 T19S, R61E, S7, 8, 16
N-42592	230-kV power line ROW, varying width, NV Energy	T19S, R60E, S1–4 T19S, R61E, S6, 7, 15, 16
N-75025	500-kV power line ROW, 200 feet, NV Energy	T19S, R60E, S1–4 T19S, R61E, S6, 8, 9, 15, 16
N-75060	Fiber-optic line, 10 feet, NV Energy	T19S, R60E, S1–4 T19S, R61E, S6, 8, 9, 15, 16
N-76432	Fiber-optic line, varying width, NV Energy	T19S, R60E, S1–4 T19S, R61E, S15, 16
N-62830	R&PP Act lease, recreational park, 246.31 acres (in the CTA study area), City of Las Vegas	T19S, R60E, S2
N-76844	15-kV underground distribution line, varying width, NV Energy	T19S, R60E, S2
N-36876-01	R&PP Act lease, recreational park, 742.03 acres (in the CTA study area), assignment of lease from State of Nevada to City of Las Vegas	T19S, R60E, S2–4
N-29832	Road and sewer line ROW, varying width, City of Las Vegas	T19S, R60E, S3
N-77820	Two 7.5-million-gallon reservoirs, 10 acres; and pipeline ROW, 50 feet, Moccasin/Durango, City of North Las Vegas	T19S, R61E, S6
N-49747-01	R&PP Act lease, urban park facilities, 163.08 acres (in the CTA study area), City of North Las Vegas	T19S, R61E, S7
N-59611	Road ROW, varying width, City of North Las Vegas	T19S, R61E, S7
N-65720	Water pipeline ROW, 10 feet, Southern Nevada Water Authority (SNWA)	T19S, R61E, S7
N-80965	Pump station ROW, varying width, NV Energy	T19S, R61E, S7
N-82313	Fiber-optic line ROW, 10 feet, Central Telephone Company	T19S, R61E, S7
N-76304	Fiber-optic line ROW, 10 feet, NV Energy	T19S, R61E, S8
N-76305	Grand Teton substation, transmission line, and road ROW, varying width, NV Energy	T19S, R61E, S8
N-77675	Underground telephone facilities ROW, 10 feet, Central Telephone Company	T19S, R61E, S8
N-83310	Grand Teton Drive road, drainage and sewer utilities ROW, varying width, City of North Las Vegas	T19S, R61E, S10, 15, 16
N-66225	Water pipeline, varying width, SNWA	T19S, R61E, S8, 17

In addition to the authorized land uses identified in Table 3.8-1, lands in the CTA study area are popular with residents and visitors to the area for outdoor recreation uses, including hiking, horseback riding, back-country driving, mountain biking, natural history and cultural resource study, and sightseeing. Lands in Eglington Preserve (in the southeastern portion of the CTA) are managed for the protection of sensitive native plants.

Uses of notable lands adjacent to the CTA study area also influence how lands in the CTA study area are used. Floyd Lamb Park, on the southern boundary of the CTA study area, is a popular recreation destination for residents and visitors to the LVV. Adjacent public lands in the CTA study area are leased for recreation purposes to complement the purposes of Floyd Lamb Park. Thus, the residents and visitors use adjacent public lands in the CTA study area for similar recreation purposes. Tule Springs is listed in the NRHP for its role in the history of American archaeology and the study of early humans and Pleistocene fauna. Its cultural and paleontological resource values attract scientists and visitors to the CTA study area. The Las Vegas Paiute Tribe manages three golf courses on the Paiute Reservation, adjacent to the northwestern portion of the CTA study area.

Table 3.8-2. Pending Authorized Uses in the Upper Las Vegas Wash CTA Study Area

Serial No.	Description	Legal Description (Township, Range, Section)	Comments
N-58546	Perimeter fencing ROW, Las Vegas Paiute Tribe	T18S, R59E, S22–24 T18S, R60E, S19, 30, 31	
N78395-01	Three Lakes Project ROW temporary-use permit, SNWA	T18S, R59E, S22	
N-83498	Fiber-optic cable ROW, NV Energy	T18S, R59E, S22	
N-83499	230-/138-kV transmission line ROW, NV Energy	T18S, R59E, S22	
N-83499-01	Short-term workspace for electrical line ROW, NV Energy	T18S, R59E, S22	
N-37233	Water retention basin ROW, City of Las Vegas	T18S, R60E, S33	
N-77772	Sheep Mountain Parkway (formerly Mountain Edge Parkway) ROW, City of Las Vegas	T18S, R60E, S31–33 T19S, R60E, S1–4 T19S, R61E, S3–6, 8–10	
N-36876-01	Floyd Lamb, sale of 1,041 acres to the City of Las Vegas	T19S, R60E, S2–4	R&PP Act lease has been issued (see Table 3.8-1), but the patent to the City of Las Vegas is pending.
N-53584	Reservoir ROW and interception berm (diversion dike), City of North Las Vegas	T19S, R60E, S1, 3, 4	Partial ROW issued (see Table 3.8-1).
N-62830-01	Floyd Lamb Park, sale of 320 acres to the City of Las Vegas	T19S, R60E, S2	R&PP Act lease has been issued (see Table 3.8-1), but the patent to the City of Las Vegas is pending.
N-77820	Two 7.5-million-gallon reservoirs and pipeline ROW, City of North Las Vegas	T19S, R61E, S6	Original ROW issued (see Table 3.8-1). This is a request for additional lands to be added to the ROW for pipeline and road expansion.

3.9 RECREATION

A number of recreation opportunities are provided by local, state, and federal agencies on public lands within and adjacent to the CTA study area. These recreation activities include both casual, dispersed uses as well as organized events for which BLM issues use permits. Typical dispersed recreation in the CTA

study area includes picnicking, biking, hiking, jogging, and horseback riding. There are several user-created routes but no formally established trails.

BLM defines recreation value through the Recreation Opportunity Spectrum (ROS). The ROS represents a process in which 1) the recreation opportunities in an area are identified based on the area's setting and activities; and 2) the area is then assigned to one of five categories that define management objectives. In terms of recreation, BLM lands in the LVV are categorized as modern urban with rural; roaded natural; semi-primitive motorized; or semi-primitive non-motorized.

3.9.1 Recreation Areas

There are a number of local recreation and conservation areas under federal and state management adjacent to and near the CTA study area (Figure 3.9-1). In addition to BLM, managing agencies include USFWS, USFS, NPS, and Nevada Division of State Parks.

BLM records and tracks the visitor data through the Recreational Management Information System. Visitor use is based on actual numbers where available, such as traffic counts at Red Rock Canyon NCA or at OHV events at Nellis Dunes. Otherwise, visitor use is compiled on the basis of BLM's knowledge and professional estimates for specific activities and locations.

Recreation Sites within or adjacent to the Conservation Transfer Area Study Area

Las Vegas Special Recreation Management Area encompasses the CTA study area. The objective of the Las Vegas Valley Special Recreation Management Area is to coordinate with county and city governments to facilitate the provision of open space areas, recreational trails, and parks for LVV residents (BLM 1998b). Floyd Lamb Park, originally known as Tule Springs, is located in the south-central part of the CTA study area. Floyd Lamb is a natural park unique to the typical Las Vegas urban experience and provides opportunities for picnicking, hiking, biking, horseback riding, fishing, wildlife viewing, and historic sightseeing. The 680-acre Floyd Lamb Park has seen several owners and caretakers over the years and was most recently owned by Nevada Division of State Parks Department of Conservation and Natural Resources. In July 2007, the park and all leased lands and water rights were transferred to the City of Las Vegas. The transfer included preparation of a master plan for the park that ensures that Floyd Lamb Park and the adjoining 1,361 acres of BLM lands (R&PP Act lease land) are used only for recreation, conservation, and critical municipal infrastructure purposes. Nearly 200,000 people visit Floyd Lamb Park annually; most daily visitors are local residents who wish to retreat from the pace of urban life. There is a fee to enter the park, which includes a variety of recreation facilities, the historic Tule Springs Ranch, an equestrian park, the Las Vegas Gun Club shooting range, and a nursery run by the NDF (City of Las Vegas 2007a).

Managed by Clark County Parks and Recreation, Clark County Shooting Park began construction in October 2007, and Phase I opened to the public in March 2010. Clark County Shooting Park provides venues for rifle, pistol, shotgun, and archery shooting, informal daily and event shooting opportunities, firearms safety training and skill development, hunter education, and conservation education programs. In addition, there is a specialized "tourism range" for group shooting activities and classrooms for conferences (Clark County 2007).

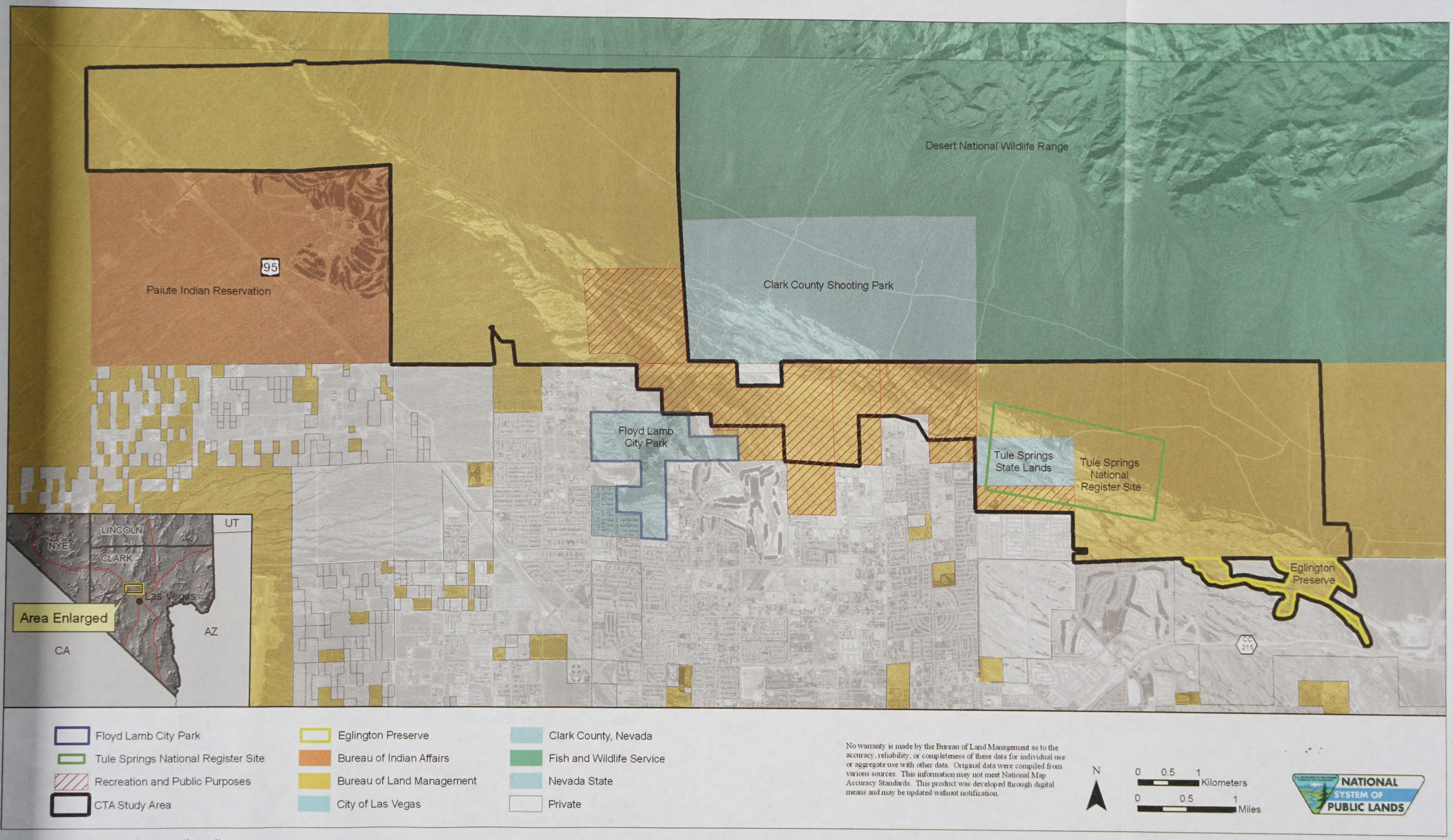

Figure 3.9-1. Regional recreation sites.

Willie McCool Regional Park, leased from BLM, is a relatively remote site (Southern Nevada Regional Planning Coalition 2006). The 160-acre facility is surrounded by open desert to the north and east and is used as both a model airplane flying field and a trial nursery. Residents frequently use this park to fly model airplanes, and special meets and competitions are regularly sponsored by various clubs and organizations. Apart from the model airplanes, the University of Nevada–Reno and the Cooperative Extension Service have an experimental nursery to test water usage and the adaptability of non-native plants to the harsh desert climate. There is a significant amount of unused land in this park (City of North Las Vegas 2007a). Plans for the park detail a fully developed regional park with sports fields, picnic sites, playgrounds, park lighting, and other amenities.

The DNWR is part of the National Wildlife Refuge (NWR) Complex, which includes Pahranagat NWR, Ash Meadows NWR, Moapa Valley NWR, and Amargosa Pupfish Station, and is located directly north of the CTA study area. The largest NWR in the lower 48 states, DNWR includes the Sheep Mountain Range and supports habitat for desert bighorn sheep and other species. Recreation opportunities include camping, hiking, backpacking, bird watching, horseback riding, and OHV use on designated roads and trails for pleasure. Limited hunting for desert bighorn sheep is permitted once a year between November and January.

USFWS is in the compliance phase of a proposed new visitor center and administrative complex at the Corn Creek Field Station, which would accommodate more than 100,000 visitors annually. Corn Creek serves as the main entrance to DNWR and contains staff offices, a visitor contact station, and an information kiosk. Other facilities associated with the new building, such as parking areas, roads, utilities, and infrastructure, would also be improved or constructed. Additionally, USFWS would expand and improve some of the trails through the Corn Creek Springs area and provide new visitor opportunities. The new visitor center would be constructed at the field station in the same location as the existing visitor contact station, kiosk, and restrooms and would be designed to meet Leadership in Energy and Environmental Design standards. New parking areas and road improvements would be completed south of the existing facilities in desert upland habitat. Habitat rehabilitation would occur throughout the Corn Creek Springs area.

REGIONAL RECREATION SITES

Red Rock Canyon NCA is located along the west side of the CTA study area. Recreation activities include sightseeing, climbing, hiking, biking, and interpretive programs sponsored by BLM. Desert bighorn sheep hunting on a tag basis, managed by the Nevada Department of Wildlife, is allowed once a year between November and January above an elevation of 5,000 feet. Red Rock NCA contains the only developed campground managed by BLM in the LVV. The Spring Mountain Ranch State Park is located within Red Rock Canyon NCA. Recreation opportunities include picnicking, historic tours, living history programs, and summer theater programs.

The Sloan Canyon NCA is located south of Las Vegas and is managed by BLM. This area contains unique scenery, geological features, and cultural resource values. Recreation activities include hiking and viewing archeological, biological, and geological resources. Designated an NCA in 2002, the management of the area is in the planning process.

The 40,000-acre Sunrise Management Area is to the east of the CTA study area and includes the Frenchman-Sunrise Mountain Natural Area. This area was designated the Rainbow Garden Area of Critical Environmental Concern (ACEC) for its unique geological, biological, and scenic values. Recreation activities include backpacking, picnicking, hiking, biking, and rock hounding.

BLM-managed Nellis Dunes Recreation Area is to the northeast of the CTA study area. Nellis Dunes Recreation Area is a popular recreation site for casual use by OHV enthusiasts.

The Spring Mountain NRA is to the northwest of Las Vegas and is part of the Humboldt-Toiyabe National Forest. The area is locally referred to as Mt. Charleston. Recreation opportunities include hiking, camping, climbing, snow skiing, snowboarding, sightseeing, OHV use for pleasure, picnicking, and bird watching.

Lake Mead NRA is a popular visitor and water recreation destination. It is to the east of Las Vegas near Boulder City. The recreation area has 200,000 surface acres of water and 950 miles of shoreline on Lakes Mead and Mojave. Recreation opportunities include boating, fishing, water skiing, personal watercraft use, diving, parasailing, picnicking, camping, and isolated back-country use. Table 3.9-1 gives all regional recreation sites.

Table 3.9-1. Regional Recreation Sites

Name	Agency	Size
Red Rock Canyon National Conservation Area	BLM	195,819 acres
Sloan Canyon National Conservation Area	BLM	48,438 acres
Sunrise Management Area	BLM	40,000 acres
Nellis Dunes National Recreation Area	BLM	10,181 acres
Spring Mountain National Recreation Area	USFS	316,000 acres
Lake Mead National Recreation Area	NPS	1.5 million acres of land, 200,000 acres of surface water, and 950 miles of shoreline

OFF-HIGHWAY VEHICLE USE

Management of OHV activities by federal agencies on public lands is intended to conserve soil, wildlife, water quality, native vegetation, air quality, and cultural resources while providing appropriate recreational opportunities and promoting the safety of all users. The use of OHVs on BLM lands has increased in popularity in recent years and accounts for more than 4 million visitor-hours throughout the jurisdiction of the BLM Las Vegas Field Office (BLM 1998a). The term OHV refers to a motorized vehicle that is capable of off-highway travel and includes both street-legal, licensed vehicles (dual-sport motorcycles, 4×4 vehicles, sport-utility vehicles) and all-terrain vehicles and dirt motorcycles that are not street legal or licensed (BLM 2004a).

Off-highway access is designated in order to protect resources and the landscape from damage, ensure public safety, and minimize conflicts between users. The three main designations are "open," "limited," or "closed" to OHV use (Table 3.9-2). Designations are made through the land use planning process and are updated and revised as necessary to meet resource management objectives and to mitigate OHV-related impacts.

Operators of OHVs must comply with Nevada laws and federal regulations when on public lands. Use is limited to existing or designated roads and trails on lands within and adjacent to the CTA study area. Illegal OHV traffic, particularly dirt-bike riding, in the CTA study area is common and is a legitimate concern for BLM land managers.

PUBLIC TRAILS SYSTEM

The Southern Nevada Regional Planning Coalition, represented by Clark County, the Clark County School District, and the Cities of Las Vegas, North Las Vegas, Henderson, and Boulder City, developed a plan for a system of interconnected trails throughout the LVV. The plan addresses 1) primary urban trail corridors that follow highways, utility ROWs, flood control facilities, and natural features, such as desert

washes and ridge lines; and 2) secondary trails that are integrated into existing and planned public infrastructure and ROWs. The locations of primary and secondary trails were selected on the basis of the trails' ability to connect to federal lands.

Table 3.9-2. Bureau of Land Management Off-Highway Vehicle Use Designations

Open	Area of intensive OHV use, with no resource, user, or public safety conflicts.
	Vehicle travel permitted both on and off roads.
	Vehicle must be operated responsibly and must not cause significant damage to resources or affect other authorized uses of public land.
	Restricted OHV use to meet specific resource management objectives.
	Vehicle travel permitted only on existing roads and trails in existence prior to the designation.
Limited	Vehicle travel permitted only on designated roads and trails that are identified, signed, and mapped by BLM.
	Vehicle travel limited by number and type of vehicle.
	Vehicle travel limited by time or season.
	Vehicle travel limited to licensed or permitted use.
	Prohibited OHV use to protect resources, ensure visitor safety, and reduce conflicts.
Closed	Vehicle travel not allowed either on or off roads or trails.
	Access by non-motorized vehicle is generally allowed.

The SNPLMA allocated funds for development of parks, trails, and natural areas in Clark County. Between 1999 and 2003, approximately $75 million was allocated to the trail system in Clark County. An additional $57 million was allocated to Clark County Wetlands Park, which includes an extensive public trails system.

The City of North Las Vegas has secured initial funds in the amount of $500,000 from Congress through SNPLMA for a multi-use pedestrian pathway along the ULVW as part of the regional and local trail system linking the residents of North Las Vegas and other jurisdictions to the DNWR, BLM Sunrise Management Area, Las Vegas Wetlands Park, Red Rock NCA, and Lake Mead NRA. The first linkage to this multi-use trail system consists of 8.5 miles of trails that follow the Western Tributary of the LVW from the intersection of the 215 Beltway and Lake Mead Boulevard. The second linkage in this trail system entails a 6-mile trail that runs north from Interstate 15 for approximately 6 miles to reach the North Las Vegas detention basin. From this detention basin, the trail continues east, providing a possible connection to DNWR. The initial funding was followed by a second set of funds from Congress through SNPLMA in the amount of $7.6 million for the second phase of the trail, which would provide trailheads and allow for the purchase of ROW and trail node areas, construction of pedestrian crossings and bridges, trail or park elements, and amenities, along with trail development and landscaping. It is anticipated that completion of the trail would occur during this phase, although a third phase may be required.

A portion of the ROW purchase was funded previously, and funding for construction in the ROW was approved. This funding is another significant step in the larger vision of a recreation corridor and neighborhood park system along the LVW, which are goals in the *City of Las Vegas Master Plan 2020* (City of Las Vegas 2006c). Features such as paved walkways, play and picnic areas, landscaping, and restrooms are planned for the corridor. The Las Vegas Wash Trail would ultimately extend for approximately 20 miles and cross the CTA study area, stretching from Floyd Lamb Park to Lake Mead NRA.

3.10 TRANSPORTATION

The Las Vegas metropolitan area was one of the fastest-growing populations in the nation, with an increase of nearly 25% between 2000 and 2006. The current population is approximately 1.8 million (U.S. Census Bureau [Census Bureau] 2006). Although growth has slowed down, it has not stopped, and future developments are likely to facilitate additional growth in the future (RTC 2008). The metropolitan area consists of the Cities of Las Vegas, Henderson, North Las Vegas, Boulder City, and other unincorporated locales. A large network of roadways serves the transportation and travel needs within the LVV, which are coordinated by the RTC. In the long term, as the LVV grows, transportation needs to be planned and managed.

3.10.1 Transportation Infrastructure

The CTA study area is at the north end of the LVV. U.S. Highway 95 passes through the northwest corner of the CTA study area. The 215 Beltway (also known as Clark County Highway 215) is approximately 1.5 miles south of the CTA study area. Travel routes to and within the CTA study area consist primarily of graded dirt roads and paved roads and include Moccasin Road, Decatur Boulevard, Aliante Parkway, Horse Drive, and Grand Teton Drive (Figure 3.10-1). Streets and roads in LVV are generally classified according to basic use, design, and function. Table 3.10-1 gives classifications for streets and roads that occur near the CTA study area.

There is a network of ways within the CTA study area that have been created by repeated casual vehicle use. These ways are not classified and do not access allowable uses or ROWs within the CTA study area.

The most significant travel corridor adjacent to the CTA study area is U.S. Highway 95. It is a four-lane, divided, limited-access freeway, and it is used as both a major interstate transportation route and a local and regional transportation route to access the communities of northwest LVV and in other parts of Nevada, such as Indian Springs. There are full-access interchanges at both Paiute Way and North Durango Drive. U.S. Highway 95 crosses approximately 1.2 miles of northwest corner of the CTA study area, but there is no direct access from U.S. Highway 95 to the CTA study area.

The 215 Beltway is a 53-mile-long roadway that encircles much of the western portion of the LVV. The beltway currently functions as three different road types: a four-lane divided freeway, a four-lane limited access expressway, and a four-lane frontage road. The beltway is an interstate highway that runs from the Interstate 515 interchange in Henderson to the Interstate 15 Interchange in North Las Vegas. The 215 Beltway passes through the following cities and towns in the LVV:

- Las Vegas
- North Las Vegas
- Summerlin South
- Spring Valley
- Henderson

Vehicle Traffic

Traffic in the project area has become progressively more congested over time. Table 3.10-2 gives the average annual daily traffic (ADT) between 2004 and 2006. The population growth within the Las Vegas metropolitan area has led to an increase in the number of drivers using the roadways.

The Texas Transportation Institute (TTI), part of Texas A&M University, publishes the annual Urban Mobility Report. This report includes Las Vegas and shows how the city's growth trends compare with traffic congestion. The number of rush hours—times at which congestion is occurring—in Las Vegas increased from 7.4 to 7.8 hours between 2000 and 2005 (TTI 2005). Another measure calculated in the Urban Mobility Report is the Travel Time Index, which compares peak-period travel with free-flowing travel. It is a measure of congestion that focuses on each trip and each mile of travel. The Travel Time Index for Las Vegas in 2005 was 1.3, making it No. 18 out of the 68 urban areas measured (TTI 2005). A value of 1.3 means a 20-minute free-flowing trip would take 26 minutes during peak congestion times.

Table 3.10-1. Roadway Type and Characteristics in the Conservation Transfer Area Study Area*

Functional Classification	Characteristics	Name of Roadway in CTA
Rural Minor Collector	• Access to abutting single-family homes • Fewer than 200 vehicles per day total in both directions • Direction restriction access control • 40-foot ROW	• None
Urban Collector† (Major)	• Access to abutting single-family homes • Typically four lanes • More than 3,500 vehicles per day total in both directions • No access control • 80-foot ROW	• Log Cabin Way • Horse Drive • Farm Road • Deer Springs Way • Dayton Street • State Street • Walnut Road
Urban Collector† (Minor)	• Access to abutting single-family homes • Two travel lanes and a center turn lane and median • Contain more driveways, left turns, and intersections • 1,500 to 3,500 vehicles per day total in both directions • No access control • 60-foot ROW	• Rocky Avenue • Gilbert Lane • Brent Lane • Racel Street
Rural Major Collector	• Access to industrial and commercial lands • 1,500 to 3,500 vehicles per day total in both directions • No access control • 60-foot ROW	• None
Minor Arterial	• To convey traffic from local and collector streets • 3,500 or more vehicles per day total in both directions • Partial access control by means of limits on driveway locations and/or raised medians in the street • 100- to 120-foot ROW	• Moccasin Road • Iron Mountain Road • Grand Teton Drive • Centennial Parkway • North 5th Street • Pecos Road • Losee Road • Lamb Boulevard • Decatur Boulevard • Aliante Parkway • Jones Boulevard • Durango Drive
Principal Arterial	• To convey traffic between regional activity centers • 3,500 or more vehicles per day total in both directions • Full access control; limited access at interchanges	• U.S. Highway 95 • 215 Beltway

* Roadway Functional Classification, Las Vegas Urbanized Area, as approved in January 2010 (NDOT 2010).

† Streets that connect neighborhoods to the larger arterial streets are vital to overall circulation and make up a significant portion of the major street network.

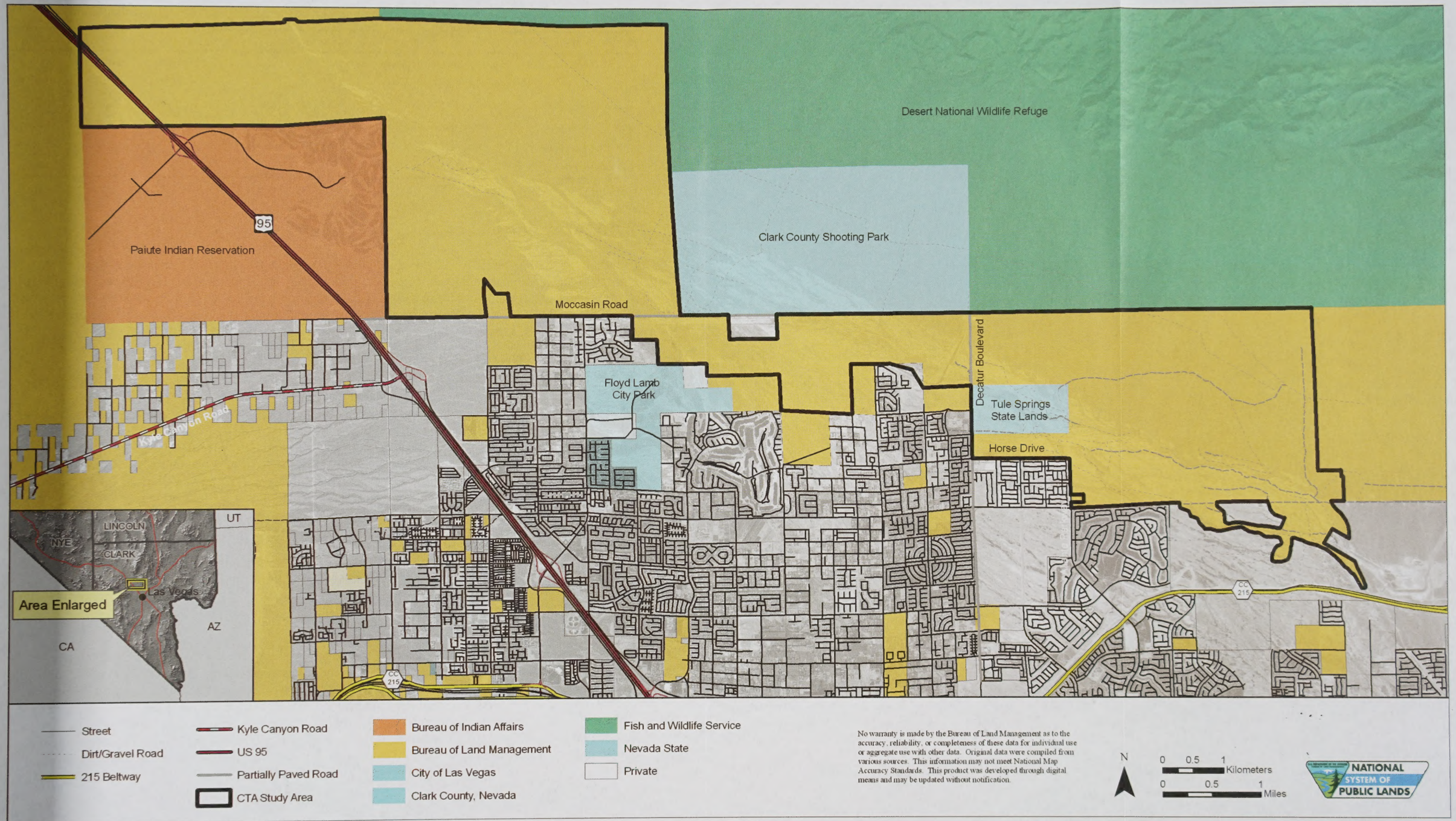

Figure 3.10-1. Transportation infrastructure in the Conservation Transfer Area study area.

Table 3.10-2. Nevada Department of Transportation Current Average Annual Daily Traffic, 2004–2006

Route Location	2004	2005	2006
Grand Teton Drive, 0.1 mile west of Decatur Boulevard	1,950	1,650	1,850
Grand Teton Drive, 0.1 mile east of U.S. Highway 95	430	840 *	890*
U.S. Highway 95 north, at State Route 157 (Charleston Park Road interchange)	10,500	10,500	11,100
Jones Boulevard, 0.3 mile north of Clark County 215	8,400*	16,200	16,000
U.S. Highway 95 north, 0.1 mile north of Milepost 129, 9.25 miles north of Indian Springs	3,900	3,900	3,650
Decatur Boulevard, 0.2 mile north of Centennial Parkway	12,500	18,600	20,100

* Data adjusted or estimated.

3.10.2 Access

Current travel within the CTA study area includes access to the Clark County Shooting Park along Decatur Boulevard and access to existing transmission lines, infrastructure, and private property adjacent to the CTA study area along Moccasin Road, Durango Drive, and Grand Teton Drive (see Figure 3.10-1). Travel across the CTA study also moves along existing unimproved dirt roads and ways. The majority of the CTA study area is not accessible from any existing transportation network.

3.11 NOISE

Noise is defined as any sound that is regarded as a nuisance. Exposure to prolonged, high levels of noise can result in temporary or permanent hearing loss or tinnitus (a ringing or roaring in the ears) and can also present safety issues. Noise can be perceived as a particular nuisance in rural or recreational settings because background noise levels in these settings are typically low and any disturbance to ambient conditions may be more pronounced. The most common problems with noise within the CTA study area are not health related but rather result from noise that is simply bothersome or annoying.

The impact of noise is variable, depending on such factors as distance from the sound source, air temperature and humidity, and frequency (hertz) of the sound. The atmosphere more readily absorbs sound produced at high frequencies. Other environmental factors that influence the propagation of sound are wind, terrain, and vegetation, which can either reflect or absorb sound.

3.11.1 Ambient Conditions

Sensitive noise receptors include residences, hospitals, libraries, recreation areas, churches, and similar venues. The CTA study area is bordered by both recreation and residential uses. Recreation facilities include Floyd Lamb Park to the southwest, Eglington Preserve to the east, Paiute Reservation Golf Course to the west, McCool Regional Park to the south, and DNWR to the northeast, the future Clark County Shooting Park to the north, and R&PP Act lands that are encompassed by the CTA study area. Residential uses are generally to the south of the project area and include the Aliante master-planned development and a limited number of residences on the Paiute Reservation to the west. The remaining land to the south of the CTA study area is largely privately owned.

3.11.2 Clark County

Clark County Zoning Development Code 30.68.020 establishes maximum allowable noise levels, measured in decibels (dB), for impulsive and persistent noise. Impulsive noise levels cannot exceed 56 dB during the daytime and 46 dB at night within residential districts. Within business and industrial districts, impulsive noise levels cannot exceed 65 dB during the daytime and 61 dB at night. Allowable persistent noise levels vary, depending on proximity to residential or business or industrial districts and the frequency of occurrence of the noise. Table 3.11-1 gives the maximum permitted sound levels in dB for Clark County (CCDCP 2007a).

Table 3.11-1. Clark County Maximum Permitted Sound Levels

Octave Band Center Frequency (hertz)	Residential Districts (dB) Daytime	Residential Districts (dB) Nighttime	Business and Industrial Districts (dB) Daytime	Business and Industrial Districts (dB) Nighttime
31.5	72	65	76	65
63	65	58	69	62
125	58	50	62	54
250	53	44	58	49
500	50	40	55	45
1,000	47	37	52	42
2,000	43	33	49	38
4,000	40	30	46	35
8,000	37	27	43	32

Source: CCDCP (2007b).

The CTA study area does not currently generate significant levels of unwanted noise. There is noise from overflying aircraft from Nellis Air Force Base. Recreation uses include hiking, camping, picnicking, mountain biking, climbing, sightseeing, and OHV use. OHV use is strictly limited to existing roads, trails, and dry washes, although some illegal OHV use does occur.

The Clark County Shooting Park occupies 2,800 acres and includes buffers for wildlife study areas, for a paleontological protection area, and for safety and noise (Nevada Legislature 2007). A noise assessment for the shooting park was completed and concluded, "Based on the measured ambient noise levels of between 44 and 50 dBA at property lines of the closest residences and the projected noise levels associated with individual firings of various firearms, it can be reasonably concluded that most individual discharges of firearms would be much below ambient noise levels and likely would not be discernible. In any case, all firearms would be much below the Clark County's 56 dBA noise limit" (Clark County 2009).

3.11.3 City of Las Vegas

City of Las Vegas Ordinance 9.16.005-050 prohibits excessive noise, particularly between the hours of 11 p.m. and 7 a.m. daily. Exceptions to this rule exist for emergency situations, public events such as carnivals and parades, and the necessary operations of public businesses. Construction noise must occur between 7:00 a.m. and 6:00 p.m. daily, with the exception of urgent instances in which public health and safety may otherwise be at risk. In those instances, the Director of the Department for Planning and Development must issue a permit, valid for a maximum of 30 days.

Floyd Lamb Park, on the northern boundary of Las Vegas, is used by Las Vegas residents as an urban retreat. The park does not currently generate unwanted noise, as its primary use is for passive recreation, such as hiking and picnicking. Limited residential housing is adjacent to a portion of the CTA study area to the south but is not considered a noise nuisance.

Transportation networks near the CTA study area include U.S. Highway 95, a northwest-southeast, four-lane divided highway in the western portion of the CTA study area.

3.11.4 City of North Las Vegas

The City of North Las Vegas, as part of City Ordinance 8.28.010–040, prohibits excessive, unreasonably loud, disturbing, or unnecessary noise, particularly between the hours of 11:00 p.m. and 7:00 a.m. daily. One noted exception to this rule includes non-amplified crowd noises at planned student, government, community, sporting, and entertainment events or gatherings (City of North Las Vegas 2007b).

McCool Regional Park is currently used as a model airplane–test demonstration garden and is operated by the City of North Las Vegas. The City of North Las Vegas is in the process of planning sports facilities, such as fields, courts, and sports lighting, to facilitate active recreation opportunities (BLM 2007a). The sports fields may or may not include amplified noise, such as loudspeakers during sporting events. Spectators may also contribute to an increase in ambient noise levels surrounding the park. If amplified noise is employed at McCool Park, the City Council must grant a variance that would allow "reasonable activities not deleterious to the public welfare to be conducted" (City of North Las Vegas 2007b). In order to approve the variance, a public hearing and notification process must take place prior to the City Council vote.

Vehicular traffic consisting of automobiles, buses, and trucks makes a significant contribution to noise levels in the City of North Las Vegas and surrounding areas. Grand Teton Drive and the 215 Beltway border the study area and may contribute to an increase in ambient noise levels within the CTA study area.

3.12 HAZARDOUS MATERIALS

Hazardous materials are defined as any item, agent, or substance that poses a serious threat to human health or the environment as a result of its quantity, concentration, physical, or chemical characteristics. Substances characterized as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (commonly referred to as the "Superfund" law) [42 USC 9601 *et seq.*], and hazardous waste classified under the Resource Conservation and Recovery Act of 1976, as amended (RCRA) [42 USC 6901 *et seq.*], are subsumed by this definition of hazardous materials.

In accordance with ASTM Standard E 1527-00 guidelines, a modified Phase I Environmental Site Assessment was conducted as part of the original LVVDB FEIS (BLM 2004a). The Phase I Environmental Site Assessment, which was adapted to account for the size of the LVVDB and the nature of the undertaking, included a records review and a limited site reconnaissance. The following section presents the results of a supplemental records review and site reconnaissance conducted within the limits of the CTA study area and is intended to update the 2004 LVVDB FEIS hazardous materials study.

3.12.1 Records Review

Using the minimum search distances outlined by ASTM, a review of federal, state, and local environmental databases was conducted to identify reported releases of hazardous materials within the CTA study area. The results of the federal, state, and tribal records review are presented in Tables 3.12-1 and 3.12-2 and are shown in Figure 3.12-1. Appendix F provides a detailed description of each environmental database.

Table 3.12-1. Federal Database Search Results for Reported Releases of Hazardous Materials in the CTA Study Area

Federal Regulatory Databases	Updated	Radius (miles)	Findings
National Priority List (NPL)	07-10-07	1.0	0
NPL (Delisted)	07-10-07	0.50	0
Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)	07-18-07	0.50	0
CERCLIS No Further Remedial Action Planned	07-18-07	0.50	0
RCRA Corrective Actions	06-06-06	1.0	0
RCRA Treatment, Storage, and Disposal	06-06-06	0.50	0
RCRA Generators	06-06-06	0.25	0
RCRA No Longer Regulated	06-06-06	0.12	0
Federal Institutional and Engineering Controls	07-17-07	0.25	0
Emergency Response Notification System	12-31-06	0.12	0
Federal Wells	12-28-06	0.50	11

Table 3.12-2. State and Tribal Database Search Results for Reported Releases of Hazardous Materials in the CTA Study Area

State and Tribal Regulatory Databases	Updated	Radius (miles)	Findings
Tribal Lands	12-01-05	1.0	1
State/Tribal Sites Corrective Action Cases	04-04-07	1.0	3
State/Tribal Solid Waste Landfills	06-27-02	0.50	0
State/Tribal Leaking Underground Storage Tanks	04-04-07	0.50	0
State/Tribal Underground Storage Tanks/Aboveground Storage Tanks	04-30-07	0.25	0
State/Tribal Engineering Controls	NA	0.25	0
State/Tribal Institutional Controls	NA	0.25	0
State/Tribal Voluntary Remediation Programs	NA	0.50	0
State/Tribal Brownfields	03-31-06	0.50	0

Fifteen sites were identified within or adjacent to the CTA study area boundary. Eleven of the sites represent federal wells located within 0.5 mile of the CTA study area limits. Of the 11 wells, only two have been identified within the CTA study area. The two well listings are FW-NV-1207/09419647 and FW-NV-1208/09419648; they appear to be used by USGS for groundwater investigations.

A search of the state and tribal databases yielded four additional sites. One of the four listings indicates that tribal lands are present within the subject property. A small overlap between the CTA study area and Paiute Reservation boundaries submitted in the database search explains why the tribal land listing was generated. There are, however, no tribal lands within the CTA study area limits.

The remaining three sites are NDEP Corrective Action listings for impacted soil. NDEP case files were reviewed for two of the listings; records for the third listing were not examined because the reported release occurred in 1992 and regulatory closure happened in the same year.

The Southern Nevada Paving Mobile Source (NDEP Case File H-000275) was reported 0.1 mile south of the CTA study area limits. In 2004, a ruptured hydraulic line on construction equipment released approximately 10 gallons of hydraulic oil into surrounding soil. The impacted soil was excavated in 2005, and NDEP issued a finding of "No Further Corrective Action Required."

The second listing was reported approximately 0.88 mile southwest of the CTA study area. Centennial Pointe Property (NDEP Case File H-000318) was granted regulatory closure in May 2005 after 148 tons of impacted soil were excavated to mitigate a release of total petroleum hydrocarbons.

Supplemental information was obtained for the CTA study area beyond the standard ASTM searches. These resources, the respective search distances, and the findings are provided in Table 3.12-3.

In addition, the LR2000 database was consulted to identify mineral actions on which hazardous materials have been stored or released and closed mining claim records. According to the database, there have been no hazardous materials storage or releases associated with minerals actions within the CTA study area boundary. There are, however, more than 200 closed mining claims within the study area. The complete reports are provided in Appendices G through I.

Table 3.12-3. Results of ASTM Supplemental Records Review of Reported Releases of Hazardous Materials in the CTA Study Area

Regulatory Database	Updated	Radius (miles)	Findings
Receptors	01-01-05	0.50	0
Facility Index System	11-01-06	0.25	0
Toxic Release Inventory System	06-04-07	0.25	0
Hazardous Materials Incident Response System	07-03-07	0.25	0
National Compliance Database System	09-22-06	0.25	0
Polychlorinated Biphenyl Administrative Database System	04-12-07	0.25	0
Docket Integrated Compliance Information System	01-09-06	0.25	0
Nuclear Permits	04-30-99	0.50	0
Releases	12-31-06	0.25	0
Federal—Other	05-21-07	0.25	0
Site Enforcement Tracking System Potentially Responsible Parties	11-19-02	0.15	0
State—Other	01-01-07	0.25	0
Coal Gasification	12-31-05	0.50	0
Oil and Gas Wells	01-08-01	0.50	0
Fire Insurance Map Coverage	05-11-07	0.12	0

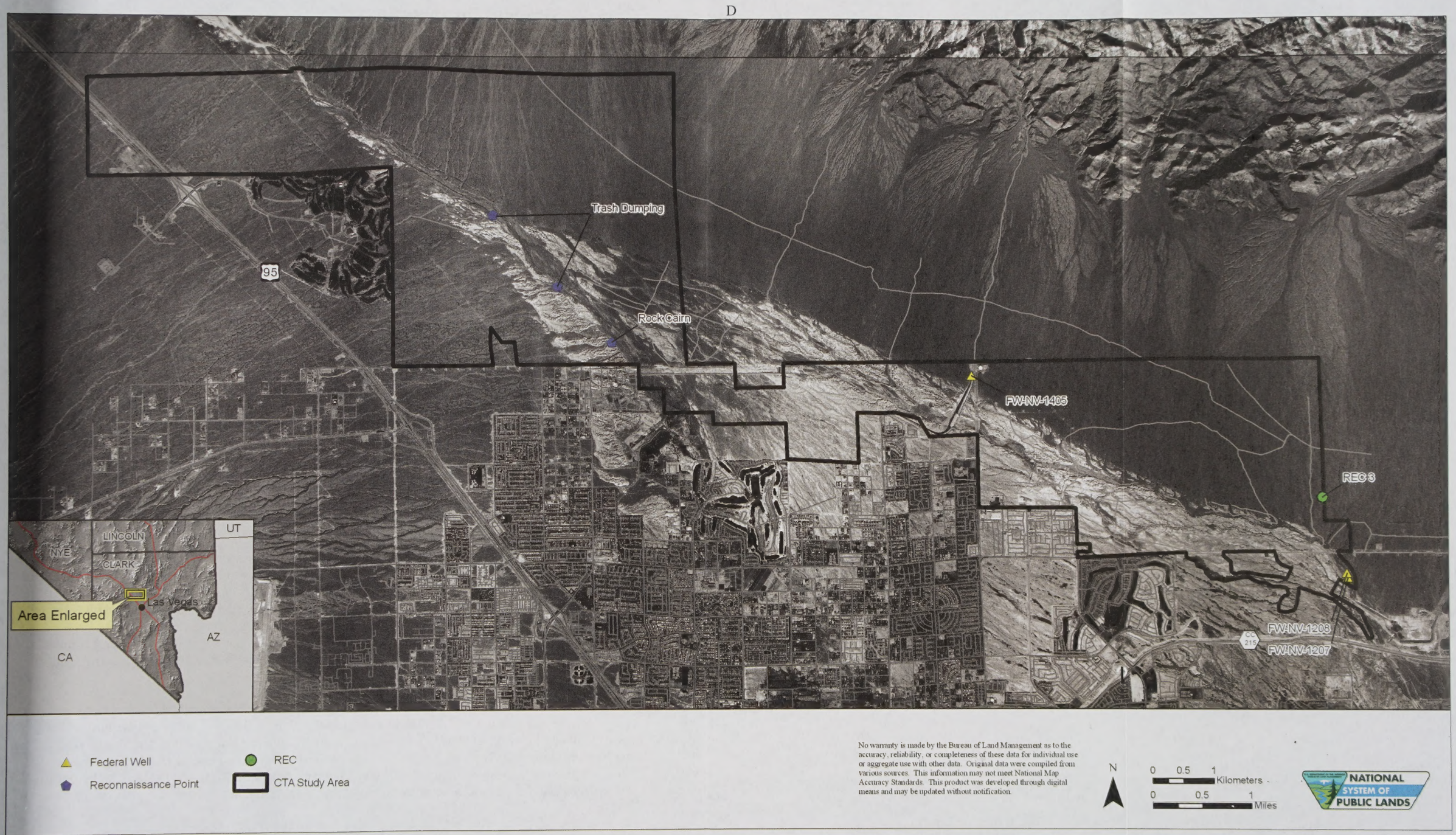
D
Trash Dumping
Rock Cairn
95
FW-NV-1405
REC 3
FW-NV-1208
FW-NV-1207
LINCOLN
NYE
CLARK
UT
Las Vegas
Area Enlarged
AZ
CA
Federal Well
Reconnaissance Point
REC
CTA Study Area
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.
N
0 0.5 1 Kilometers
0 0.5 1 Miles
NATIONAL SYSTEM OF PUBLIC LANDS

Figure 3.12-1. Federal, state, and tribal database search results for reported releases of hazardous materials in the Conservation Transfer Area study area.

3.12.2 Site Reconnaissance

A general and cursory site reconnaissance of the CTA study area was conducted on August 30, 2007. The project limits were inspected through pedestrian and vehicular methods using existing roads. Occasional trash was observed along ULVW from the vicinity of Floyd Lamb Park eastward. Areas of urban dumping and evidence of target practice were noted primarily near the residential developments adjacent to the CTA study area. A single rock cairn, which may represent a mining claim, was identified in the northwestern portion of the CTA study area. A stormwater detention basin was noted within the CTA study area limits near North Decatur Boulevard. In addition, a Nevada Energy (NV Energy) substation that was observed off North Decatur Boulevard appears to adjoin the CTA study area. Portions of the southeastern extent of the CTA study area limits are fenced, and posted signage designates these as Eglington Preserve.

3.12.3 Recognized Environmental Conditions

ASTM defines a recognized environmental condition (REC) as "the presence or likely presence of any hazardous substance or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property."

The site reconnaissance conducted as part of the original LVVDB FEIS (BLM 2004a) hazardous materials study identified five RECs. One of these RECs, identified in the LVVDB FEIS as REC 3, was reported along the eastern boundary of the CTA study area. Located on Assessor Parcel Number 124-10-000-001, REC 3 is described as consisting of steel pipes protruding from the ground. Although the function of the pipes is unknown, contaminants could be entering the soil or groundwater through these pipes. No additional information regarding the prior use of the pipes was provided in the original Phase I Environmental Site Assessment. The previously reported REC 3 was not observed during the site reconnaissance conducted for the current evaluation.

3.13 SOCIOECONOMICS

BLM is required to integrate social science information in the preparation of informed decisions. Section 102 of NEPA requires federal agencies to "insure the integrated use of natural and social sciences . . . in planning and decision making." The first section describes the existing population, economic, social and housing conditions, financial resources, and facilities and services in the socioeconomic study area to help analyze potential impacts from the proposed project to social and economic conditions. The second section discusses some of the social trends and changing attitudes that may have an impact to public land management, as well as some of the individuals and groups who could be affected by the different alternatives.

Since the SEIS process was initiated, social and economic circumstances in the LVV have changed as a result of the recent housing crisis and associated credit problems. There is uncertainty regarding how these circumstances will influence the Las Vegas economy and population in the near future. Statistics on current population and economic conditions have been updated in the Final SEIS where appropriate. However, even with these changing circumstances and current uncertainty, the best available data from the Nevada State Demographer continue to project strong population growth in the next 20 years (NSD 2008).

3.13.1 Study Area

The study area for this analysis includes the communities most likely to be affected by the proposed project. These include Clark County, City of Las Vegas, City of North Las Vegas, and Las Vegas Paiute Tribe, which has dual locations—the Paiute Reservation community, adjacent to the CTA study area, and the Las Vegas Colony, in downtown Las Vegas. Other towns or cities near the CTA study area were dismissed from analysis because of their size or distance from the CTA study area. The Las Vegas–Paradise metropolitan statistical area encompasses Clark County and is therefore represented in Clark County data.

This discussion describes the social and economic conditions of Clark County in southern Nevada and, when appropriate, communities near the LVW that may either have an impact to or be affected by the CTA study area. The discussion of Clark County is focused primarily on the LVV because it accounts for 97% of the county's population and households. Discussion of the Paiute Reservation and Las Vegas Colony are combined in this analysis because of the overlapping information from both areas.

Information for the socioeconomic conditions comes from a variety of sources. The Census Bureau and Bureau of Economic Analysis (BEA) identify major characteristics by county and some communities. Similarities and differences between Clark County, the communities, and the State of Nevada are discussed. Data from various agencies within the State of Nevada and Clark County are also used.

3.13.2 Community Perceptions

The most significant factors affecting the character and economy of the LVV are the tourism and gaming industries. Gaming has been an integral part of the development of Las Vegas; by the end of World War II, the area had become a desert oasis and gaming resort town. The LVV has become an entertainment, gaming, and recreation mecca, with 150 casinos and roughly 60 golf courses in Clark County, as well as access to thousands of acres of state and federal lands. There are numerous recreation opportunities, such as the nearby Hoover Dam, Lake Mead NRA, and Humboldt Toiyabe National Forest.

The moderate cost of living and lack of state income taxes have stimulated economic growth over the past decade. Additionally, the cost of living is lower in the LVV than in comparable U.S. cities, such as Albuquerque, Houston, Phoenix, and San Jose (Applied Analysis 2007). The historic population growth and housing development have brought new challenges with respect to transportation and public services. For the most part, these challenges are being adequately addressed or planned for; there are many plans for new facilities, including medical facilities, public schools, and roads. Appendix J discusses historic housing, crime, and public service expenditures, including education, utilities, and health care.

Social Trends

Nevada has consistently been one of the fastest-growing states in the country, with Clark County being one of the fastest-growing counties in the U.S. In 2006, Clark County had a population density of 225.6 people per square mile (Census Bureau 2007b). Clark County is the thirty-fifth fastest-growing county in the U.S. in terms of housing (Census Bureau 2007a). Migration to Clark County continues to be the greatest contributor to population growth. According to CCDCP and the Nevada State Health Division, the net migration to Clark County in 2005 was 4,480 people per month. In contrast, the average monthly natural increase (births minus deaths) was 1,243 people (CCDCP 2005). Table J.1 in Appendix J gives information on population characteristics by age and education.

A comprehensive report on recreation for the City of Las Vegas (2006b) indicates that parks were the second-most common place respondents spent most of their free time (second only to home). The survey reported that walking, hiking, and biking were in the top 10 leisure activities that residents enjoy.

Changing Attitudes

In January 2005, Greenways, Inc. (Greenways), prepared the *Northwest Open Space Plan* for the City of Las Vegas Comprehensive Planning Division (Greenways 2005). In support of the plan, the ETC Institute conducted a community attitude and interest survey in 2004 to establish priorities for the planning of parks, trails, open space areas, and outdoor recreation areas for northwestern Las Vegas (ETC Institute 2004). The ETC Institute study was designed specifically to assess priorities for Las Vegas residents for the planning of parks, trails, open space, and outdoor recreation. The study asked respondents to rank from a list of 12 specific goals the three most important goals for an open space plan. Forty-two percent of respondents rated providing habitat for wildlife, birds, and plant life in the top three, 36% rated preserving natural areas and viewsheds in the top three, and 32% rated providing cultural facilities in the top three. Large community parks and walking trails were ranked as the two categories of use Las Vegas residents were most likely to take advantage of in the next year (ETC Institute 2004).

Attitudes and perceptions regarding the LVW have also been documented. A study by USU (2009) included a comprehensive social survey that focused on the relationship between the residents' attitudes and degree of ecological disturbance in the LVW. The study found that residents living closer to the wash and residing longer in the area reported higher familiarity with the wash area and were considerably more likely to use the wash area. Types of activities reported were walking/hiking, exercising pets, bird/wildlife viewing, bicycling, and running/jogging. However, the residents' proximity to the wash did not prove to be important predictors that residents would report ecologically damaging activity in the wash.

For almost a decade, Roper Starch Worldwide (Roper), in conjunction with the National Environmental Education and Training Foundation (NEETF), has conducted an annual nationwide survey that offers insight into Americans' perceptions of the environment. In 2001, NEETF and Roper published the *Ninth Annual Report on Environmental Attitudes, Knowledge, and Behavior*, which summarized their findings (NEETF and Roper 2001). More than 63% of Americans believe that environmental protection and economic development go hand in hand, whereas only 25% believe we must choose between the two. When forced to choose between the environment and the economy, 71% of Americans would choose the environment. In general, when support for the nationwide economy is strong, so is support for the environment. These data are relatively consistent over time (NEETF and Roper 2001).

Growing concern for the environment has sparked debate about placing a monetary value on preserving natural resources. Because many environmental values cannot be traded in the marketplace, quantifying the value of natural resources can be difficult. Several types of value can be attributed to natural resources (Ecosystem Valuation 2008). *Use value* is a person's willingness to pay for the direct use of an environmental resource. Direct use includes the active value of a resource, such as hiking, biking, wildlife observations, etc. Direct use can also mean the passive value of a resource, such as a television show about whales, which provides indirect value for whales. *Option value* is a person's willingness to pay for the future use of a natural resource; for example, although a person may not have visited Grand Canyon National Park, she may place value on the possibility of visiting it in the future. The final, most difficult value to quantify is *non-use value*, or existence value. Non-use value represents an individual's willingness to pay to preserve a resource he may never visit. Combined, use value, option value, and non-use value can represent the total willingness to pay for preservation of a natural resource (Price 2007).

Stakeholders and Affected Groups

During stakeholder meetings held in 2005 prior to the public scoping process, groups had the opportunity to share their specific goals, objectives, and vision for the CTA with the BLM. Following is a discussion of the values and attitudes of various stakeholders who will be affected by the proposed project; the stakeholder groups include the Cities of Las Vegas and North Las Vegas, Clark County, CCRFCD, utility companies, developers, and environmental, neighborhood, and recreation groups. It should be noted that these discussions generalize from and simplify the members' actual values and attitudes. In addition, this format is not meant to imply that these groups are mutually exclusive, and examples of individuals fitting into all categories are likely to be present. For instance, recreationists may engage in motorized and non-motorized types of recreation and may have high levels of concern about the environment. In addition, people's attitudes and interests may change over time.

Clark County

Clark County's vision is for a dynamic, vibrant community that values diversity, opportunity, and partnerships, fostering a healthy environment where individuals and families choose to live, work, and play. Clark County recognizes the environmental sensitivity of the CTA study area and the valuable recreational opportunities the CTA study area provides for Clark County residents. Clark County is a cooperating agency on the SEIS. The various members of the Board of County Commissioners have expressed a range of positions relating to the CTA, from supporting conservation of the entire 13,622-acre CTA study area to maximum development.

In 2002, Clark County announced a partnership with Southern Nevada University that will use private funding to develop and implement programs to bring the benefits of natural world to disadvantaged youths in Clark County. Additionally, Clark County uses development fees to fund studies of the Las Vegas buckwheat and bearpoppy plants through the MSHCP.

Within Clark County, the Cities of Las Vegas and North Las Vegas will be most directly affected by the proposed project. Withdrawal of lands from potential development will change the pattern of development in both cities for generations to come.

City of Las Vegas

The City of Las Vegas is committed to providing residents, visitors, and the business community with the highest-quality municipal services in an efficient, courteous manner and to enhancing the quality of life through planning and visionary leadership. The City of Las Vegas is a cooperating agency on the SEIS.

The CTA study area is between the Cities of Las Vegas and North Las Vegas in the LVV; lands west of Decatur Boulevard in the CTA study area are within the incorporated limits of the City of Las Vegas. Increased development and population pressures in the LVV have led to concerns about limiting the availability of developable land while ensuring preservation of open spaces. The City of Las Vegas has identified the proposed Sheep Mountain Parkway, flood control detention basins, and utilities (electricity, water, and sewer) as uses desired on lands within and/or north of the CTA study area.

In 2005, the City of Las Vegas prepared the Northwest Open Space Plan (Greenways 2005). The primary goal of the plan is to "improve the quality of life and community character of northwest Las Vegas with a well planned system of interconnected open spaces, greenways, trails, parks, and protected landscapes" (Greenways 2005:EX-1).

The City of Las Vegas has expressed support for the protection of ecological, cultural, and paleontological resources in the CTA study area; however, the challenge will be to ensure that continued development opportunities and the associated economic benefits of development are not compromised while balancing growth with preservation of natural resources in the CTA study area.

Specifically, the City of Las Vegas is concerned about the impact that preserving the CTA study area would have to future development patterns; for instance, would non-availability of lands adjacent to existing developments result in leapfrog development? Other issues that involve the City of Las Vegas include concern for public health and safety, such as the ability of law enforcement and emergency response personnel to respond to recreationists, and meeting the transportation needs of an increasing population. The City is cooperating with NDOT and Federal Highway Administration on planning for the proposed Sheep Mountain Parkway to provide multi-modal transportation facilities to accommodate increased travel demands in LVV.

City of North Las Vegas

Like the City of Las Vegas, the City of North Las Vegas is responsible for its citizens and for providing development opportunities, transportation, public safety, and other city services, as well as open space and conservation. The City of North Las Vegas is committed to being a balanced, well-planned community that provides quality municipal services, education, housing, recreation, and leisure opportunities, economic vitality, security, public safety, strong community partnerships, and civic pride for a culturally rich, active, diverse population. Lands east of Decatur Boulevard in the CTA study area are within the incorporated limits of the City of North Las Vegas. Commensurate with the request of the City of Las Vegas, the City of North Las Vegas is a cooperating agency on the SEIS and has shown considerable interest in the process.

The City of North Las Vegas embraces the opportunity to establish the CTA; however, like the City of Las Vegas, the City of North Las Vegas is concerned about balancing conservation with development constraints, particularly with regard to city infrastructure (utilities, transportation, and public health and safety). The City of North Las Vegas has identified the same infrastructure elements as the City of Las Vegas, such as Sheep Mountain Parkway and the need for flood control basins.

Other issues of concern to the City of North Las Vegas include what protection standards will be implemented for rare plants and cultural and paleontological resources and coordinated use of the CTA study area as a wildlife habitat with the nearby DNWR.

Las Vegas Paiute

The Paiute Reservation is adjacent to the northwestern part of the CTA study area. For the Las Vegas Paiute Tribe, the LVW is a highly significant area that is crucial to the spiritual, cultural, historical, anthropological, and ecological heritage of southern Nevada's ancestral and contemporary indigenous peoples, including the Anasazi, Chemehuevi, and various Paiute tribes. The Las Vegas Paiute Tribe is a cooperating agency on the SEIS. As part of the more expansive Salt Song Trail system, the LVW has been used for multiple generations as a migration and trade route, and along with the mountain ranges that border the LVW, is vital to tribal identity. The LVW represents an important traditional landscape and potential TCP for the Las Vegas Paiute Tribe and other tribal communities in the area, including the Chemehuevi and Moapa Paiute.

Preservation of the natural state of the LVW and the alluvial fans leading north and east up to the Sheep Mountain Range is crucial for the protection of ancient burial grounds and other sacred sites, for an understanding and appreciation of the Native American experience, for the preservation of the plant and

animal life in environmentally sensitive lands, and for the visual landscape. For these reasons, the Las Vegas Paiute Tribe urges that the proposed CTA include the entire geological boundary of the LVW as well as the lands north of the LVW that lead up to the DNWR and the adjacent mountain range.

The Las Vegas Paiute Tribe originally requested a buffer on the north and east sides of the Paiute Reservation from potential future urban development and to provide protection from visual and social disturbances associated with adjacent residential areas and transportation networks. The Las Vegas Paiute Tribe has also expressed concern for protection of the economic benefits of its golf resort, which may be diminished by nearby development and the loss or obstruction of views of the native desert and the Spring Mountains. The Las Vegas Paiute Tribe has recently been working closely with the City of Las Vegas on mutually beneficial future planning.

Resource Groups

A variety of individuals and organizations at the local, regional, and national levels have expressed interest in the SEIS and offered input during the scoping process. Many of their comments focused on endangered or rare fauna and flora, non-renewable resources, such as paleontological and archeological resources, and preservation of the hydrologic functioning of the LVW. Concerns regarding endangered flora and fauna include protection of the endangered Las Vegas bearpoppy, Merriam's bearpoppy, Las Vegas buckwheat, the remnant communities of catclaw acacia, honey mesquite, and desert willow that provide habitat for a diversity of bird, mammal, and reptile species, and the establishment of ecological preserves. Non-renewable resource concerns include protection of Pleistocene fossils, fossil spring formations, and archaeological resources.

The following groups have indicated that the condition of resources on public lands is important because they value these resources for a variety of reasons, including wildlife, recreation, education, scenic qualities, wilderness, and open space.

PROTECTORS OF TULE SPRINGS

Protectors of Tule Springs is a conservation group of concerned homeowners who aim to protect the 13,622-acre area in the ULVW from further development. Their vision is to protect the area through future designation of an NCA or National Monument so that people of all ages can study, learn about, and enjoy the non-renewable resources. They envision an Ice Age Park and Visitor Center focused on education, research, and tourism.

SIERRA CLUB

The Sierra Club is a national organization that aims to explore, enjoy, and protect the wild places of the earth and to practice and promote responsible use of the earth's ecosystems and resources. The Sierra Club is interested in protecting a variety of resources in the ULVW, including unique plants and animals, such as Las Vegas bearpoppy, Merriam's bearpoppy, endemic poppy bees, kit foxes, burrowing owls, Las Vegas buckwheat, mesquite and mistletoe stands that support phainopepla, and a variety of reptiles. Non-renewable resources include Pleistocene fossils and the fossil spring formations in which they are found. The Sierra Club also is interested in preserving the working of the LVW itself as a healthy desert wash, which means preserving the natural functioning of the wash to handle storm flows during rain events, as well as maintaining its banks and flow patterns. The organization also envisions a future ULVW Rare Plant Preserve, which would protect the ecosystems, provide a retreat from urban areas, provide hiking trails, bicycle paths, and foot bridges across the wash, and feature informational signs highlighting the rare and endemic resources.

THE NATURE CONSERVANCY

The Nature Conservancy is an international, non-profit organization dedicated to the conservation of biological diversity whose mission is to preserve the plants, animals, and natural communities that represent the diversity of life on earth by protecting the lands and waters they need to survive. The Nature Conservancy's vision is for a carefully designed conservation strategy for the ULVW that would ensure the long-term survival of all viable native species, natural communities, ecological systems, and paleontological resources and provide public access and use for low-impact activities, such as hiking, picnicking, photography, and nature observation.

ARCHAEO-NEVADA SOCIETY

The Archaeo-Nevada Society is a local group of individuals interested in various aspects of archaeology, such as history, prehistory, and historic preservation. The purpose of the Archaeo-Nevada Society is to preserve Nevada's antiquities, encourage the study of archaeology, and educate the public on the aims of archaeological research. Archaeo-Nevada is an affiliate of the Nevada Archaeological Association and the Society for American Archaeology. Their vision is to protect the ULVW for educational, research, and tourism purposes.

NEVADA FRIENDS OF PALEONTOLOGY

The Nevada Friends of Paleontology is an organization that promotes the scientific and educational value of Nevada's fossil record by enhancing the knowledge of paleontology among amateur, student, and professional paleontologists, sharing new discoveries and knowledge with the scientific community and general public for the advancement of paleontology within the state, and promoting the protection and ethical study of Nevada's paleontological resources. They join Protectors of Tule Springs in their vision of protecting the ULVW and the future creation of a park that would focus on education, research, and tourism.

CITIZENS ACTION COMMITTEE FOR TULE SPRINGS

The Citizens Action Committee for Tule Springs consists of members of the Tule Springs Preservation Committee and local citizens. Their goals center on promoting and taking care of Floyd Lamb Park at Tule Springs. Citizens Action Committee for Tule Springs aims to develop small projects and expand services at the park and work with the City of North Las Vegas to manage the master plan.

Citizens Action Committee for Tule Springs envisions a new entranceway into the park and a paleontological and archaeological museum for the visitors' center. The majority of the structures within the park's historic area are listed in the NRHP and require cosmetic improvements. Thus, their plans also include historic building improvements.

State Parks

The Nevada Division of State Parks plans, develops, and maintains a system of parks and recreation areas for the use and enjoyment of residents and visitors. The Nevada Division of State Parks also preserves areas of scenic, historic, and scientific significance in Nevada. A portion of Tule Springs is state owned but is not designated a state park. The Nevada Division of State Parks would prefer that the state lands in Tule Springs be managed by the same entity that will manage the CTA under a cooperative agreement.

Nevada Division of Forestry

NDF is responsible for the protection and conservation of plant species determined by the State Forester to be threatened or endangered. Their goal regarding the disposal area is to maintain healthy, viable populations of all native flora determined to be endangered or in need of conservation, such as Las Vegas bearpoppy and Las Vegas buckwheat. They envision habitat protection for these plants in the LVW as well as in Eglington Preserve (in accordance with the 2006 Conservation Agreement, established to protect from disturbance nearly 300 acres of habitat of these species in the ULVW south of Grant Teton). NDF would be a cooperating agency in a conservation agreement that relegates management of the CTA in perpetuity either to the BLM, to an appropriate conservation organization, or to any capable conservation agency.

Nevada Department of Wildlife

The Nevada Department of Wildlife has a mission to protect, preserve, manage, and restore wildlife and its habitat for their aesthetic, scientific, educational, recreational, and economic benefits to citizens of Nevada and the U.S. and to promote the safety of persons using vessels on the waters of Nevada.

Nevada Department of Wildlife's interest in the management of the area primarily concerns urban wildlife interface, interpretation, and education opportunities, as well as the potential for the area to serve as a buffer for the DNWR and the impact to wildlife from management of the CTA as open space.

U.S. Fish and Wildlife Service

The vision of USFWS for the ULVW is to work with others to conserve, protect, and enhance wildlife, plants, and their habitats for the continuing benefit of the American people. USFWS is a cooperating agency on the SEIS. Additionally, USFWS would work with interested partners to accomplish the following for the ULVW:

- develop and implement a conservation strategy to protect and enhance the biological, paleontological, cultural, and other resources within the ecosystem;
- preserve known locations of sensitive plant species, particularly Las Vegas buckwheat and bearpoppy, and their suitable unoccupied habitat to maintain viable populations of these species in an unfragmented ecosystem;
- strive to maintain the integrity of the natural ephemeral wash and ecosystem, avoiding modifications and alterations of the wash to the extent possible; and
- provide a variety of educational and interpretive opportunities for the public to enjoy and appreciate the unique biological, paleontological, and cultural resources in and around the wash.

Educational Institutions

UNIVERSITY OF NEVADA–LAS VEGAS

The University of Nevada–Las Vegas (UNLV) Public Lands Institute facilitates and conducts high-quality research, education, and outreach that promote greater stewardship of natural and cultural resources. The Public Lands Institute is fully engaged in education to strengthen the national fabric that is essential for the protection, conservation, and management of public lands. The Public Lands Institute, together with its partners, creates new knowledge, advances technology, improves education, and engages the public. Their vision is the formation of Tule Springs Community Research Park, with a Visitor Center, which would protect the biodiversity and non-renewable resources and provide educational

programs in geology, paleontology, and archaeology, as well as research and excavation opportunities for schools and other educational institutions.

DESERT RESEARCH INSTITUTE

The Desert Research Institute excels in environmental research and the application of technologies to improve people's lives by fostering scientific talent for the advancement and integration of terrestrial, hydrologic, atmospheric, and anthropological sciences. The Desert Research Institute applies scientific understanding to the effective management of all natural resources while meeting Nevada's needs for economic diversification and science-based educational opportunities. Their vision includes protecting the ULVW as an intact parcel, uncompromised by urban development, in order to preserve rare plants, animals, migratory birds, and non-renewable paleontological and archaeological resources.

Utilities

NV ENERGY

NV Energy serves more than 807,000 electric customers in Las Vegas, North Las Vegas, Henderson, other communities, and unincorporated areas of Clark County. NV Energy's service territory encompasses approximately 4,500 square miles. Because of the high in-migration rates of Clark County and the strong success of the gaming industry, NV Energy faces the challenge of one of the highest growth rates of any electric utility in the country. NV Energy envisions protection for existing and future corridor lines traversing the area and assurance that those rights will be maintained in BLM land transfer documents or acknowledged in future land use designations in order to serve the growing demand for power.

SOUTHERN NEVADA WATER AUTHORITY

The Southern Nevada Water Authority (SNWA) is responsible for management and delivery of water resources in southern Nevada and has existing and planned future water facility infrastructure in the area of the CTA study area. SNWA is currently planning a water transmission pipeline parallel to an existing pipeline in Grand Teton Drive. This new pipeline is needed to meet the projected water demands of the purveyor members. Although design of this pipeline is not expected until 2016, SNWA envisions acquiring a ROW for the proposed pipeline corridor, as well as protection for existing and future corridor lines traversing the general area and assurance that those rights will be maintained in BLM land transfer documents or acknowledged in future land use designations in order to serve the growing demand for water.

SOUTHWEST GAS CORPORATION

Southwest Gas Corporation principally engages in the business of purchasing, transporting, and distributing natural gas to residential, commercial, and industrial customers in the southwestern U.S. Southwest Gas Corporation envisions that their existing ROWs will be maintained in BLM land transfer documents or acknowledged in future land use designations and that potential ROW utility corridors will be permitted to serve the growing population.

KERN RIVER GAS TRANSMISSION COMPANY

Kern River transports approximately 85% of the natural gas consumed in southern Nevada. Because Southwest Gas Corporation has a constrained southern system and because Kern River is connected to the abundant, growing Rocky Mountain natural gas supplies, Kern River anticipates serving all of southern

Nevada's future growth requirements. Kern River intends to expand its main line, which will require the construction of a new pipeline around the LVV and filing a ROW grant application to construct new facilities. Kern River envisions protection for existing and future corridors that provide services to the many utility companies whose lines traverse the general area and assurance that those rights will be maintained in BLM land transfer documents or acknowledged in future land use designations.

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

The mission of CCRFCD is to improve the protection of life and property for existing residents, future residents, and visitors from the impacts of flooding. CCRFCD aims to solve flooding problems and to regulate land use in flood hazard areas. CCRFCD envisions that the ULVW will have natural channeling of floodwaters in order to cost-effectively avoid water quality and flood control problems when future development occurs. CCRFCD proposes two potential flood control structures within the CTA study area in an effort to respond to flooding problems and to regulate land use in flood hazard areas.

Developers

Developers are concerned about potential limitations placed on the availability of public lands for residential and commercial use. Developers indicate that public land needs to be managed to be as productive as possible in order to meet the demand of the growing LVV population. Local governments and developers had contemplated that this land would be available for development and growth and generally feel that development can occur without destroying resources if appropriate mitigation measures are implemented.

One developer, Focus Property Group, owns land that is virtually surrounded by the CTA study area. Focus Property Group has not yet settled on detailed development plans.

Recreation Groups

Recreation is a component of most lifestyles in the study area. The substantial recreation opportunities for hiking, biking, horseback riding, OHV use, and sightseeing are an important element of the overall quality of life for residents. Recreationists represent diverse groups of people, and changes in recreation management can affect recreationists quite differently. They tend to organize into interest groups; most recreation activities have at least one group that advocates for their activity. Comments received on recreation during the scoping period included the following concerns: maintaining or increasing access to BLM lands for hiking, biking, horseback riding, education, and research; and restricting or maintaining OHV use, minimizing the negative effects of OHV use and motorized travel on resources, and enforcing OHV regulations.

SOUTHERN NEVADA REGIONAL TRAILS PARTNERSHIP

The Southern Nevada Regional Trails Partnership's vision for the ULVW is that it be protected from development in perpetuity. They envision rare fauna and flora protection, a future visitor center for educational use, historic and archaeological research, and multi-use equestrian trails (excluding motorized recreation) with picnic benches that can be used for walking, jogging, and sightseeing. Trails would be marked and maps made available so that known sites of interest would be avoided. The Southern Nevada Regional Trails Partnership envisions that ownership would be retained by BLM, in cooperation with educational and environmental organizations, while maintaining recreation opportunities for the public.

SHADOW RIDGE CROSS COUNTRY COACHES

There are 41 schools in Clark County that field cross-country teams, and Shadow Ridge Cross Country Coaches envision developing running and jogging paths in the CTA study area to allow walking, jogging, and running while preserving the archaeological resources and biodiversity of the area. This would provide the public with minimal-impact recreation opportunities and would benefit school cross-country teams by providing an elite training and racing area.

NORTHWEST LAS VEGAS EQUESTRIAN SAFETY COALITION

The Northwest Las Vegas Equestrian Safety Coalition's vision of the ULVW CTA includes a well-planned system of interconnected open spaces, greenways, trails, parks, and protected landscapes. The CTA study area would be devoted to the preservation of natural resources and historic and cultural property, outdoor recreation, and protection of scenic landscapes. The Northwest Las Vegas Equestrian Safety Coalition envisions improvements to Floyd Lamb Park, such as a trailhead, model railroad society park, equestrian park, and archaeological park, possibly called the Northwest Cultural Park. The trail system would be a network of off-road and roadside multi-use trails serving bicyclists, joggers, hikers, and equestrians while protecting native landscapes and ecosystems, including wildlife habitat, arroyos, washes, viewsheds, and desert ecosystems.

OUTSIDE LAS VEGAS FOUNDATION

The Outside Las Vegas Foundation is dedicated to preserving federal public lands surrounding Las Vegas, enriching the experience of its visitors, enhancing the quality of life for local residents, and promoting community stewardship of these valuable resources.

The Outside Las Vegas Foundation envisions an LVW Heritage Corridor that would protect native desert ecology and paleontological resources, as well as creating opportunities for people to learn about, enjoy, and appreciate the place in which they live. The Heritage Corridor would preserve the integrity of the wash and serve as a natural laboratory for research and education. The Outside Las Vegas Foundation envisions a Visitor Center with extensive educational programming designed to meet diverse needs of the community, focusing on Mojave Desert ecology, archaeology, paleontology, and natural hydrology. It would remain undeveloped except for a network of multi-use trails that would allow access to key features and resources. The trails would serve as an interconnected system linking open spaces, such as Floyd Lamb Park, Equestrian Park, and DNWR, that would be designed to help protect and minimize disturbance to sensitive resources. The Visitor Center would incorporate the needs of various partners through shared operation and management, such as USFWS, Cities of Las Vegas and North Las Vegas, Clark County, Tule Springs Preservation Association, and The Nature Conservancy.

3.13.3 Population and Demographics

Population data were obtained from the Census Bureau (1990, 2000a, 2006) and the Nevada State Demographer (NSD 2008). Annual population in Clark County increased every year between 1985 and 2007; the average annual increase over this period was 5.8%. The lowest percentage of population increase occurred between 2006 and 2007 (4.2%), and the highest increase occurred between 1989 and 1990 (8.7%) (UNLV Center for Business and Economic Research 2007b).

Nevada

Nevada has experienced considerable growth over the past 15 years. In 2000, Nevada was the fastest-growing state in the nation, ahead of Arizona, Colorado, Utah, and Idaho. The population increased by

61.6% between 1990 and 2000, and then by another 31.1% between 2000 and 2006. Current circumstances have changed and there is uncertainty regarding how the recent housing crisis and associated credit problems will influence the Las Vegas economy and population in the near future. Despite changing circumstances and current uncertainty, the Nevada State Demographer continues to project strong population growth to occur in the next 20 years (NSD 2008). Nevada is projected to grow 20% by 2014. Nevada has a population density of 22.7 persons per square mile.

Clark County

The population of Clark County in 2007 was 1,954,319, up from 1,375,365 (42.1%) in 2000. According to NSD (2008), Clark County is expected to have a population of 3,014,975 by 2028, which is a 75.9% increase from 2007.Historically, Las Vegas has had population trends similar to those of Clark County, with an increase of 78.3% between 1990 and 2000 and of 21.2% between 2000 and 2005. The City of Las Vegas has a median age of 34.5 years. The population of Las Vegas has a distribution with varying densities; the highest density is in central downtown and along the U.S. Highway 95 corridor to the west and northwest. Las Vegas has an average density of 4,390 persons per square mile (City of Las Vegas 2006a).

The City of North Las Vegas, however, experienced an aggressive population increase during the same period, growing by 130.8% between 1990 and 2000 and by 71.9% between 2000 and 2006. North Las Vegas has a median age of 28.8, which is significantly lower than the state median age of 35.3. The availability of land for development in the city is attracting younger families to the area, as indicated by the relatively low median age.

One of the main reasons for the historic population growth in these cities has been available economic opportunities. Population growth and migration trends to these areas have decreased as a result of nation-leading rates of employment loss.

> The number of driver's licenses surrendered at local Department of Motor Vehicles offices, a commonly-used measure of population in-migration to southern Nevada, totaled 11,919 during the first quarter of 2010. This figure reflects the smallest count on record in the last 16 years (fourth quarter 1993). According to data reported by the University of Nevada, Las Vegas, the latest month's total represents a decline of 8.6 percent and 14.2 percent compared to the prior quarter and the same quarter of the previous year, respectively. As of the end of the first quarter, active electric meter counts—another indicator of population movement after adjusting for non-driving residents and out-migration—totaled 727,145, an increase of 971 quarter-over-quarter. (Clark County 2010a)

Population data for the Las Vegas Paiute Tribe are limited to Las Vegas Colony in downtown Las Vegas. The population of Las Vegas Colony in 2000 was 108, up from 86 (25.6%) in 1990. No population estimates were available for 2006. Information on the Paiute Reservation community is limited or unavailable. Thus, Census Bureau data were used for this analysis.

Other selected age and education characteristics of the communities within the LVV are given in Table J.1 in Appendix J.

3.13.4 Economic Sectors and Employment

Income and earnings data were obtained from various sources, but principally from the Clark County government and BEA. This section describes employment by industry, per capita income, and labor force statistics.

Employment

Nevada, once characterized by its mining, agriculture, and ranching culture, has in recent decades moved toward gaming, entertainment, tourism, construction, and recreation industries to accommodate its exponential growth. This is particularly true of Clark County, where the gaming-related industries and employment have continued to grow, while forestry, mining, and agricultural employment have declined in recent years. Table J.2 in Appendix J gives the major employers in Clark County. Table J.3 in Appendix J shows the breakdown by industry for Clark County and Nevada. More than 22,000 conventions were held in 2005, and tourism in Las Vegas resulted in an estimated $36.7 billion in economic impact. The gross gaming revenue in Clark County was $9.7 billion. The City of Las Vegas generated more than $7.6 billion of that revenue (City of Las Vegas 2006a).

In 2005, accommodation and food services accounted for 23.3% of total employment in Clark County, more than any other sector. Other prominent sectors included construction (10.7%), retail (10.4%), and administrative and waste services (7.1%). See Table J.3 for further information on employment by industry.

Some of the fastest-growing employment sectors in Clark County between 2001 and 2005 were health care and social assistance (208.8% growth), educational services (61.2%), management (55.9%), construction (46.4%), real estate (45.9%), and manufacturing (21.4%).

The gaming and service sectors continue to provide the greatest share of employment in Clark County. However, the largest single employer in Clark County is the Clark County School District, with 35,212 employees, followed by the Clark County government, Bellagio Hotel and Casino, and the State of Nevada. Table J.2 in Appendix J summarizes major employers in the study area, and Table J.3 summarizes employment by industry.

Per capita income is often used as a measure of economic performance, but it should be combined with changes in earnings for a realistic picture of economic health. Since total personal income includes income from 401(k) plans, as well as other non-labor income sources like transfer payments, dividends, and rent, it is possible for per capita income to rise even if the average wage per job declines over time. In other words, non-labor sources of income can cause per capita income to rise, even if people are earning less at their jobs.

Income Characteristics

The median family income for Clark County, at $50,485, is essentially the same as the state's median family income, at $50,849. Las Vegas also had a median family income similar to the state and county averages, at $50,465, while North Las Vegas had a relatively lower median family income, at approximately $46,540. The median family income for communities in Clark County but outside the LVV is typically found to be lower than the county and state averages. The Las Vegas Paiute Tribe had the lowest median family income of the communities within the LVV, at $28,611. Table J.4 in Appendix J shows the breakdown of income characteristics.

Labor Force

Both labor force and employment have recently decreased throughout the LVV. As a result of the recent economic downturn in southern Nevada, the 2010 unemployment rate in Clark County is 14.1%, an increase of 2.9% over the same period in 2009.

3.13.5 Community Resources

Housing

HOUSING INVENTORY

In response to rapid employment and population growth in Clark County, there has been a strong demand for housing over the past decade. According to CCDCP (2009), there were approximately 735,979 occupied housing units in Clark County in 2009; this number is almost 5,000 less than the 2006 numbers, which are given in Table J.6 in Appendix J. More than 58% of the occupied housing in Clark County in 2006 consisted of single-unit, detached homes. Of the 740,817 housing units in Clark County in 2006, more than 292,000 units were within the Cities of Las Vegas and North Las Vegas.

Table J.6 in Appendix J illustrates trends between 1996 and 2006 in the supply of single- and multi-family homes, including condominiums, duplexes, and mobile homes. Growth during the study period was healthy for Las Vegas, North Las Vegas, and Clark County (data were not available for the State of Nevada or Paiute populations). The average household size for North Las Vegas and the Paiute Tribe was similar (3.4 and 3.5, respectively); however, the number was lower for Las Vegas (2.7). The vacancy rate in Las Vegas and North Las Vegas was comparable (7.3% and 7.1%, respectively), although it was more than double that for the Las Vegas Paiute Tribe (16.2%). It should be noted that the housing stock for the Las Vegas Paiute Tribe was only 31 units in 2000.

The numbers discussed above were available through 2000; therefore, they do not completely reflect the pattern of explosive growth of 2005 or the recent downturn in residential development.

TRENDS IN HOUSING CONSTRUCTION

The construction industry is an important contributor to the Gross Domestic Product (GDP) and overall economic activity of the Las Vegas–Paradise metropolitan statistical area. Between 2001 and 2006, the construction industry GDP increased by an average of 12.99% each year, with a total percent change for the 6-year period of 82.26% (BEA 2008). Recently, total construction permitting ending in March 2010 fell 25.3% lower than permitting activity reported for the same period in 2009 (Clark County 2010b). For a fuller discussion of new housing construction growth, see the section on real estate and residential development below.

HOUSING AFFORDABILITY

Data were available for the Las Vegas metropolitan area in terms of historic sales data, but there is no breakdown by community for Las Vegas, North Las Vegas, Clark County, or the Las Vegas Paiute Tribe (Table J.8 in Appendix J). "Based on the latest data from Homebuilders Research, new home median closing prices were down 2.7 percent compared to the prior quarter at $211,000. Median prices for existing homes were up a marginal 1.2 percent at $124,500, with a significant rate of foreclosure activity continuing" (Clark County 2010b). Median new home price in the Las Vegas metropolitan area has also decreased: the average annual appreciation rate in the third quarter of 2009 was −22.46%.

Crime

Data on various crime statistics were collected from the Bureau of Justice Statistics (BJS). BJS does not include information on the Las Vegas Paiute Tribe. Additionally, the Bureau of Indian Affairs (BIA) does not collect crime statistics. In early 2007, a proposal was put forward to create a national database called

Indian Crime Awareness Research and Evaluation (or I-CARE); this database would be used to track crimes pertaining to tribes in the future.

Offenses reported in the data are categorized as violent crimes (murder, forcible rape, robbery, and aggravated assault) or as property crimes (burglary, larceny theft, and motor vehicle theft). Additionally, the data for this report were obtained from different reporting agencies, e.g., Las Vegas Metropolitan Police Department (LVMPD) and North Las Vegas Police Department (NLVPD). Between 1995 and 2005, there was a decrease in both violent and property crimes: −26.31% in Nevada, −26.41% in Las Vegas, and −43.81% in North Las Vegas (Tables J.9 and J.10 in Appendix J).

Public Facilities and Services

Information gathered by the State of Nevada, Clark County, and the Cities of Las Vegas and North Las Vegas was used to identify the availability of public services within the LVV. Public facilities and services vary considerably by community (Table J.11 in Appendix J). As would be expected, the greatest number of facilities and services in the area of analysis for socioeconomics occur in Las Vegas.

Nevada has experienced considerable growth over the past 15 years; therefore, there has been an emphasis placed on new public facilities and services in communities to meet increased demand. There was a 78.6% increase in the population of Clark County between 1990 and 2000; there is a 75.9% increase projected by 2025. Much of the public service infrastructure and the number and capacity of public facilities will have to be expanded and upgraded to accommodate recent and expected growth. Each of the public service categories is explained in more detail below.

Public Service Expenditures

Annual capital expenditures for public services in Las Vegas totaled just over $492.6 million in fiscal year (FY) 2006 (City of Las Vegas 2007b) and just over $146.7 million in North Las Vegas. General funds for both cities are provided by property and other taxes, consolidated tax revenue, charges for government services, licenses and permits, intragovernment resources, and fines and forfeits. Clark County spent more than $519.9 million in public service expenditures for FY 2004 (Clark County Comptroller 2004).

Local Authority Development Oversight

Planning in the Cities of Las Vegas and North Las Vegas and in Clark County is conducted by local planning departments. Each entity has a zoning ordinance and master or comprehensive plan that is used to guide development within the respective planning areas. These three jurisdictions essentially operate in the same manner with regard to development oversight. Although not explicitly stated in the Las Vegas Paiute Tribe bylaws, tribal members collectively review planning proposals and vote on their preferred decision for the proposal (personal communication, Dave Brown 2007).

Development within unincorporated Clark County is coordinated by the CCDCP. Clark County has a Unified Development Code that dictates the type of development (commercial or residential) that can occur in the different areas of unincorporated Clark County. Any new subdivisions or site plans must be submitted to the Board of County Commissioners and Planning Commission, who approve, conditionally approve, or deny land use applications. The *Clark County Comprehensive Master Plan* (Clark County 2002) is a policy document used by Clark County to guide long-term physical development in the unincorporated area. The fire and energy conservation elements are currently being updated.

The City of Las Vegas Planning and Development Department manages the zoning and subdivision zoning ordinances and the land use applications and project development requirements, staffs the planning commission and historic preservation commission, and prepares master and special area plans for the City. The Planning Commission makes recommendations to the City Council regarding the City's master plan, zoning requests, and other related issues. The Planning Commission is also the final decision-maker for subdivision maps. The Las Vegas Municipal Code is the City's zoning ordinance and, like Clark County and most cities, dictates the type of development (commercial or residential) that can occur in the planning area. The City of Las Vegas adopted a new master plan in 2006 (City of Las Vegas 2006c), which is a policy document that provides the framework for several individual element plans.

Development within the City of North Las Vegas is coordinated by the Planning and Zoning Department (PZD). The PZD is responsible for planning, coordinating, and promoting land development in the community; PZD also oversees three divisions, including administration and the Current and Advanced Planning Divisions. The Current Planning Division administers all development applications, while Advanced Planning develops land use ordinances, prepares special reports, and updates and implements the City's comprehensive plan. The City updated its comprehensive plan in 2006 (City of North Las Vegas 2006). The City's zoning is administered and enforced under the North Las Vegas Municipal Code.

Education

SCHOOLS

The Cities of Las Vegas and North Las Vegas and the Las Vegas Paiute Tribe are provided public education by the Clark County School District (State of Nevada 1991). As of 2007, there were 326 elementary, middle, and high schools in the county, 11 of which opened in 2007. In 2006, the Clark County School District employed 18,046 full-time teachers and 18,259 other district employees (Applied Analysis 2007).

The Las Vegas Paiute Tribe has an education office that provides tutoring and other educational services. There is also a tribal education committee that coordinates with the Clark County Indian Education program.

In 2006, there were 23,091 kindergarten students, 122,323 elementary school (Grades 1–5), 73,015 middle school (Grades 6–8), and 83,717 high school (Grades 9–12) in Clark County's public schools. In 2005, Clark County School District student enrollment was 291,510, and by 2006, it was 302,763 (a 3.9% increase). The rate of enrollment has increased by 3.9% to 5.9% annually since 2001 (Applied Analysis 2007). An additional 12,931 students were enrolled in private schools in 2006 (most private schools are K–8).

A total of 216 schools within Clark County School District passed the Adequate Yearly Progress Report in 2006, compared with 183 in 2005. The report is part of the accountability requirement of No Child Left Behind, enacted in 2001 (Nevada Department of Education 2006).

Libraries

In 2006, there were 12 libraries in the City of Las Vegas and Clark County and two libraries in the City of North Las Vegas. These libraries are operated by the Las Vegas–Clark County Library District and do not include university libraries, of which there are five in Clark County: University of Las Vegas, Nevada State College, and three community college libraries.

Utilities

WATER SUPPLY

The Colorado River supplies roughly 90% of Southern Nevada's water; Nevada is allocated 0.3 million AFY of water from the Colorado River, while Arizona and California receive 2.8 and 4.4 million AFY, respectively. The LVV treats and returns most of its wastewater back to the Colorado River at Lake Mead via the LVW; therefore, it receives a return flow credit for the returned water. This recharge allows southern Nevada to receive additional water from the Colorado River, depending on the amount that is recharged. The area's water supply is supplemented by pumped groundwater from wells throughout Clark County and the LVV. There are three major groundwater aquifer zones between 300 and 1,500 feet below the modern ground surface.

Las Vegas Valley Water District (LVVWD), a member of the SNWA, supplies water for the nearly 1 million residents in the LVV, including the City of Las Vegas and unincorporated portions of Clark County. LVVWD was established in 1954 and is not-for-profit. The board of directors consists of the Clark County Commissioners. The water rates for the district are regulated by law, and allowable expenditures include the cost of water delivery, as well as construction and maintenance of facilities for the district. The City of Las Vegas also provides direct reuse (reclaimed) water within its municipal boundaries and those of unincorporated Clark County. This water is provided to a power plant and four golf courses in the City of Las Vegas. Total reuse for the City of Las Vegas in 2003 was about 6,400 AFY (City of Las Vegas 2003).

The City of North Las Vegas provides water service to its own residents and adjacent portions of the City of Las Vegas and unincorporated Clark County; it is also a member of the SNWA. The water supplied to the City of North Las Vegas by SNWA is supplemented by six production wells owned and operated by the city.

The Paiute Reservation received 2,000 AFY from the LVVWD as a result of a 1996 lawsuit. This allocation sustains the Las Vegas Paiute Golf Resort and a residential area (Hopkins 1999).

The SNWA system diverts water from Lake Mead; the water is treated at the River Mountains and Aldred Merritt Smith water treatment facilities and then distributed via a looped regional system. The Aldred Merritt Smith water treatment facility, constructed in 1971, can treat up to 600 million gallons per day (Mgal/day), while the River Mountains facility can treat up to 300 Mgal/day. Most of the area's water is treated at Aldred Merritt Smith. The SNWA Water Resource Plan (SNWA 2004) calls for construction of a new treatment and transmission facility that would serve as backup in the event of catastrophic failures at existing facilities.

Peak demand for the system (both treatment plants) was 476 Mgal/day in 2005. Forecasts predict that the demand could either increase or decrease, although these amounts are variable, depending on the weather and to what extent conservation measures proposed by SNWA are implemented. During most of the year, water is drawn from the Colorado River via Lake Mead; however, during the summer, groundwater is pumped from the aquifer in the LVV. The area is under extreme pressure from years of drought that have resulted in low water levels at Lake Mead, combined with the enormous population growth over the past 5 to 10 years.

SOLID WASTE AND WASTEWATER

Solid Waste disposal for the area is provided by the privately owned Republic Services of Southern Nevada. The Southern Nevada Health District regulates and manages Clark County's solid waste program.

The state's largest landfill, and the repository for Clark County waste, is Apex, located at 13550 North Highway 93 (Exit 64 of Interstate 15). In 2005, Clark County generated an estimated 10 lb per capita per day; 8 lb is disposed of, and 2 lb is recycled (NDEP Bureau of Waste Management 2007); the total deposited at the Apex Landfill in 2005 was 11,653 tons per day. Municipal waste disposal in Clark County more than doubled between 1995 and 2003 (1,227,750 tons in 1995 vs. 2,680,172 in 2005). Given current and projected disposal rates, the Apex landfill is anticipated to close in 2150.

The Clark County Water Reclamation District (CCWRD), established under NRS in 1954, is the water treatment agency for Clark County. Like LVVWD, CCWRD is a member of the SNWA. CCWRD treats wastewater from unincorporated parts of Clark County in the LVV and most of the Las Vegas Strip. CCWRD currently collects and treats (reclaims) an estimated 96 Mgal/day at the central plant in Las Vegas; however, current plans to expand will allow treatment of up to 110 Mgal/day (CCWRD 2007). This expansion will be critical as demand increases; since 1996, the influent flows have increased from 63.4 to 101.5 Mgal/day (56%). Additionally, the number of customer accounts has increased from 85,756 accounts in 1996 to 186,689 in 2006.

Neither the NDEP nor the health districts have the authority to regulate solid waste management on tribal lands. The Nevada Rural Water Association, under a contract with the U.S. Department of Agriculture, provides technical assistance to tribes on solid waste issues.

Public Safety

POLICE

The availability of full-time police protection varies throughout the LVV. LVMPD provides police protection for the City of Las Vegas and unincorporated parts of Clark County. LVMPD employs 2,635 officers and 1,649 other employees and has eight stations across the LVV. LVMPD has a service standard of one officer and two civilian personnel per 1,000 residents; as of 2001, LVMPD was on target to maintain this standard. Five new stations are in the planning phase to keep up with area growth; however, the location of these has not yet been determined (City of Las Vegas 2001). LVMPD also supports the 10-member Las Vegas Indian Colony Police Department, as needed.

NLVPD serves the City of North Las Vegas and employs 263 officers and 241 other employees. NLVPD operates out of two stations; however, it is anticipated that at least two more stations or command centers will be needed to maintain the target ratio of 1.82:1,000 residents. The location of future facilities has not yet been determined.

FIRE

The Las Vegas Fire and Rescue Department (LVFRD) serves the City of Las Vegas; LVFRD employs 672 employees and has 16 stations. Eleven new stations have been planned in compliance with Insurance Service Office standards for service radius areas. The City of Las Vegas employs approximately 0.80 fire personnel per 1,000 residents; however, the target ratio is 1:1,000. In order to meet this goal, LVFRD will have to hire at least 300 more personnel (City of Las Vegas 2001). LVFRD also supports the Las Vegas Colony.

The North Las Vegas Fire Department serves the City of North Las Vegas and has 175 employees and six stations. A seventh station is proposed for the additional call load of the growing area (City of North Las Vegas 2006). The location of future facilities has not yet been determined.

Health Care

Hospitals in the LVV include the North Vista Hospital in the City of North Las Vegas, which employs 800 doctors and 620 other staff. A Veterans Affairs Hospital is under construction in North Las Vegas and is anticipated to open in 2011. A third hospital is in the planning stages—the Meadows Hospital in North Las Vegas. No information about the hospital, including the location, was available; however, a zoning ordinance amendment (No. 2388) was passed for the proposed hospital in August 2007.

Hospitals in the City of Las Vegas include Desert Springs, Mountain View, Southern Hills, Spring Valley, St. Rose Dominican Hospital (San Martin Campus), Summerlin Medical Center, Sunrise Hospital and Medical Center (includes Sunrise Children's Hospital), University Medical Center, Centennial Hills, and Valley Hospital Medical Center. Summerlin Hospital has plans to expand their facilities, with completion expected in 2009; the expansion will double the hospital's capacity (City of Las Vegas 2002). More than 3,800 doctors and roughly 12,000 other staff are employed at these nine Las Vegas hospitals. The expansion of the Summerlin Hospital is expected to employ an additional 200 to 300 nurses and support personnel; physicians are also being recruited. There are also six additional specialty hospitals in Las Vegas that focus on long-term acute care, physical rehabilitation, etc. Physician and support staff figures were not available for these specialty hospitals.

Las Vegas established the Las Vegas Medical District, adopted by the City Council in 1997. The District encompasses approximately 214 acres and is generally bounded by Alta Drive to the north, Martin Luther King Boulevard to the east, Charleston Boulevard to the south, and Rancho Drive to the west (City of Las Vegas 2002). Facilities within the district include University Medical Center, Clark County Health Center, and Valley Hospital.

Las Vegas Paiute Tribe members, as well as other tribal members in Nevada, are eligible for health care through Indian Health Services by means of a contract administered by Equity Health Care (State of Nevada 1991). The tribe also constructed the Las Vegas Paiute Tribal Health Facility, which opened in 2005, to provide direct health services to any member of a federally recognized tribe. Currently, the clinic is available to any of the approximately 22,000 Native Americans who live in the LVV.

3.13.6 Taxes and Revenues

Nevada has a tax climate that encourages new business expansion and start-ups. The state does not have corporate or personal income tax, franchise tax on income, or inheritance gift, estate, admissions, or unitary taxes. Only those revenues that are clearly and concisely reported by the state or federal government (i.e., property taxes, sales tax, payments in lieu of taxes [PILT], etc.) were considered for the analysis. Where available, revenue information was gathered for the county and city level; however, information of this type was limited.

Real Estate/Property Tax

According to the Nevada Department of Taxation, the combined countywide real estate tax rate for Clark County is 3.102% (FY 2006–2007), which is up by 0.80% from the previous FY. In 2006, the combined property tax rate in the City of Las Vegas was $3.282 per $100 assessed value (City of Las Vegas 2006c); the rate for the City of North Las Vegas was $3.385 per $100 assessed value. The statewide average ratio

of assessed valuation to taxable value is 35%, as determined by state law. By way of comparison, the ratio of assessed valuation is 25% in Arizona and 100% in California.

North Las Vegas has four of Clark County's 92 tax districts, and Las Vegas has seven tax districts. North Las Vegas, unlike Las Vegas or Clark County, has approved a dedicated property tax levy for street and road maintenance at $23 per resident. Clark County has also adopted a development privilege tax under which revenues are used to fund beltway projects; the estimated revenue is $20 per capita (or approximately $500 per new home). The mean and median real estate taxes in Las Vegas are marginally higher than in North Las Vegas, Clark County, or Nevada (Table J.12 in Appendix J).

Payment in Lieu of Taxes

In 1976, Congress directed federal land management agencies to allocate income to states and counties with federal lands, to provide a PILT program to help offset lost tax revenues. Because BLM is the largest federal land owner and land manager, BLM was chosen by the Secretary of the Interior to administer the PILT program.

Since 1999, PILT payments received by the State of Nevada and Clark County have almost doubled. In Nevada, payments have increased in value by 96.86% since 1998, and in Clark County, payments have increased by 95.46% over the same period. Table J.13 in Appendix J gives the breakdown of the PILT program.

In 2006, the federal government owned and managed roughly 83% of the land in Nevada; as of 2006, Clark County has 56,772,898 acres of federal land within its limits. Federal lands are not subject to property taxes that support county governments and education, although local communities play an important role in supporting the management of federal lands. Congress appropriates PILT payments each year. The formula used to compute the payments is contained in the PILT Act and is based on population, receipt-sharing payments, and the amount of federal land within an affected county (U.S. Department of the Interior 2007).

Sales and Use Taxes

Sales taxes apply to the retail sale of personal property or services within the state; Nevada does not charge sales tax on food items for home use, medicine, or services. Use tax complements sales tax and is imposed on tangible personal property purchased for storage or use in Nevada on which Nevada sales tax was not paid at the time of purchase. Thus, use tax prevents sales tax avoidance or the payment of a lesser tax rate by making purchases outside the tax jurisdiction where first use, storage, or other consumption will occur. State use tax is shared between the state government and the county of origin (i.e., the county where the tax was imposed) on the same distribution basis as sales tax. Statewide sales taxes generated an estimated $70 million to fund transportation projects in 1999.

Sales tax is 6.5% across the state; however, Clark County currently assesses an option tax, making the county tax 7.75%. The option tax in Clark County is used to support public transit options and generated an estimated $41 per capita in 1999 (Institute of Transportation Studies 2007). Sales and use taxes for Nevada and Clark County are reported together by the NSD (Tables J.14 and J.15 in Appendix J). Table J.16 in Appendix J shows the breakdown of sales tax distribution in Clark County.

Overall, both state and county have seen a roughly 65% increase in sales tax revenue between 2000 and 2006. Growth was relatively healthy and increased in terms of revenue over the seven-year period; the only exception was 2002, when growth at the county level was marginal, at 1.12% (see Table J.14), and the state saw a decrease of −0.31% (see Table J.15).

Lodging Tax

Cities, towns, and counties, by voter approval, may impose a lodging excise tax on all sleeping accommodations for guests staying less than 31 days. This tax extends to mobile accommodations, such as tents, trailers, and campers. Clark County lodging tax revenue is used for street and road improvements in areas with high tourism, such as around Las Vegas Boulevard in Las Vegas. The lodging tax for Nevada is 1%. The estimated per capita revenue for Clark County is between $17 and $19. Between 2000 and 2006, there was a 32.40% increase in lodging tax revenue, which has steadily increased since FY 2002–2003 (Table J.17 in Appendix J).

3.13.7 Economic Environment

Rapid growth in the LVV has been a significant driving force in the social and economic setting of the area. Increased growth in the LVV has also exerted pressures on undeveloped federal lands, such as the ULVW area, as residential and commercial developments move closer to the fringe. The major economic stimuli come from tourism and gaming, along with real estate and residential development.

Tourism and Gaming Activity

TOURISM ACTIVITY

Visitation was down approximately by 3% in 2009 to 36,351,469, from 37,481,552 in 2008. The tourism industry is the primary industry in LVV, and the gaming and service sectors provide the greatest share of employment in Clark County. According to the *City of Las Vegas Master Plan 2020*, an estimated 2.5 jobs are created for each new hotel room; of these, one job is created within the hotel, 1.5 jobs outside the hotel (City of Las Vegas 2006c).

Tourism in the LVV is dominated by gaming; however, there is also substantial use of the nearly 3 million acres of federal land surrounding the Cities of Las Vegas and North Las Vegas. As a result, there are a host of year-round recreation opportunities for tourists, including hiking, camping, mountain biking, wildlife viewing, scenic viewing, education, and hunting. Section 3.9, "Recreation," details the numerous opportunities that exist within the CTA study area. Recreation activities are an important contributor to the economic stability of the area.

GAMING

Gaming and tourism have been the principal components of the local economy in LVV for more than 50 years. As such, these provide the primary impetus for employment growth across all major industries in the area. The economic stability, growth, and development of City of North Las Vegas have also been tied to the gaming and tourism industries; however, because it is located along two major transportation corridors, this has also promoted the development of a strong industrial base (City of North Las Vegas 2006).

There are 327 casinos in Nevada; of these, 10 are in North Las Vegas and 122 are in Las Vegas (World Casino Directory 2006). A summary of total gaming revenue in four geographic areas is presented in Table J.18. No data were available for gaming revenue in North Las Vegas, in Las Vegas as a whole, or for the Las Vegas Paiute Tribe. Nevertheless, these data present a summary of gaming activity in the region. In general, Clark County and Nevada have seen an increase in gaming revenue since 1999; 2002 was the exception, showing a −4.29% decrease in gaming revenue for the state. Downtown Las Vegas has had limited growth in terms of gaming revenue, while the Las Vegas Strip has had two years in which

revenue has dropped (−1.45% in 2001 and −7.97% in 2002); in other years, Las Vegas has seen a 5% to 13.5% revenue increase.

Gaming in Nevada has generated enormous revenues for the state. In 2006, gaming revenue contributed $838,094,000 to the state general fund (Applied Analysis 2007). The state and LVV have also benefited in terms of employment opportunities that the casinos and associated hospitality, entertainment, and service industries have generated.

Real Estate and Residential Development

Using new building permits as a measure of growth, between 1996 and 2005, growth appeared to have been concentrated in the City of Las Vegas in terms of the actual number of permits issued, even though the percent growth was much higher in the City of North Las Vegas (Table J.19 in Appendix J). However, between 1996 and 2005 in North Las Vegas, there was a 169.12% increase in the number of permits issued and a 165.52% growth in the dollar value of those permits. Meanwhile, there was −8.09% growth in Las Vegas in terms of the number of building permits and −1.83% growth in the dollar value of those permits (Table J.20 in Appendix J). Data for Clark County between 2002 and 2005 also indicate that there was a 24.25% increase in the number of permits issued and a 100.09% increase in the dollar value of those permits.

Under the current economic conditions, median home sale prices have continued to fall as the market deals with an excess supply of available housing, as one in 23 households in Nevada has received foreclosure filings. Additionally, 65% of Nevada homeowners have mortgages with negative equity. These factors point toward a slow housing recovery in southern Nevada.

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Chapter 4

ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter analyzes the potential environmental consequences, or impacts, that could occur as a result of implementing any of the alternatives described in Chapter 2. Resource topics analyzed in this chapter are the same as those described in detail in Chapter 3, "Affected Environment." Direct, indirect, and cumulative impacts are analyzed for each resource topic. If applicable to a given resource topic, mitigation measures to alleviate potential impacts are identified. Impacts are described in terms of type, context, duration, and intensity. General definitions are defined as follows, while more specific impact thresholds are given for each resource at the beginning of each section.

- ***Type*** describes the classification of the impact as either beneficial or adverse, direct or indirect.
    - **Beneficial:** A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
    - **Adverse:** A change that moves the resource away from a desired condition or detracts from its appearance or condition.
    - **Direct:** An effect that is caused by an action and occurs at the same time and in the same place.
    - **Indirect:** An effect that is caused by an action but is later in time or farther removed in distance and is still reasonably foreseeable.
- ***Context*** describes the area or location in which the impact will occur. Are the effects site specific, local, regional, or even broader?
- ***Duration*** describes the length of time an impact is anticipated to last.
    - **Short-term** impacts generally last only as long as the construction period, and the resources generally resume their preconstruction conditions following construction.
    - **Long-term** impacts last beyond the construction period, and the resources may not resume their preconstruction conditions for a longer period following construction.
- ***Intensity*** describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized into negligible, minor, moderate, and major. Because definitions of intensity vary by resource topic, intensity definitions are provided separately for each impact topic analyzed in this SEIS.

USU quantified impacts to various natural resources for their alternative futures model. Vegetation, soils, rare plants, and fossils were the focus of their investigation. Appendix K provides a comparison of the alternatives using their models.

For lands identified within the final CTA boundary, the management of proposed land actions would continue under current land use plan guidance.

A variety of new facilities, utilities, roads, and recreation infrastructure has been proposed by various stakeholders for lands within the study area. Although BLM is not making decisions about these actions as part of this process, in order to determine the direct and indirect impacts, BLM has made several assumptions regarding the location and size of potential actions under each alternative. These assumptions

are based on detailed information provided by the stakeholders (City of Las Vegas 2006c, City of North Las Vegas 2006) and on different development scenarios that may occur under each alternative.

- Actions that have been considered consist of new utilities, flood control structures, transportation infrastructure, recreation infrastructure, and other public purposes.
- Development scenarios are based on anticipated infrastructure needs associated with the various acreages identified for disposal.
- The maximum extent in acres of these potential actions has been assumed for each alternative.
- Where appropriate, it is assumed that impacts would occur proportionate to the relative amount of a resource within a particular alternative boundary.
- Mitigation requirements identified in the SEIS to prevent or limit direct impacts associated with a proposed action would be applied within the CTA boundary.
- Site-specific analysis is necessary for any future proposed action.

4.2 EARTH RESOURCES

This section evaluates the potential direct and indirect impacts to earth resources associated with each of the alternatives. This analysis specifically addresses impacts related to geological hazards and soils. In 2008, Kleinfelder (2009) conducted a hydrologic and erosion study that presents a comparative analysis of the effects on water resources and ULVW under each of the alternatives (see Section 4.3, "Water Resources"). Portions of the study are also relevant to earth resources, in particular the quantification of sediment loss under each of the alternatives. A brief summary of the water resources study, as it pertains to earth resources, is presented in this section. The complete hydrologic and erosion analysis can be found in Appendix L. Table 4.2-1 presents the annual erosion impacts for each alternative.

Table 4.2-1. Comparison of Annual Erosion Impacts by Alternative

Water Resources	Baseline	A	B (Preferred)	C	D	E	No Action
Alternative Boundary (acres)	12,622.7	12,952.5	10,495.6	6,362.3	5,301.4	3,313.8	1,448.2
100-Year Peak Flow Upstream of Decatur Basin (cfs)	13,750	13,790	14,840	15,960	16,490	16,720	17,130
100-Year Peak Flow Downstream of Decatur Basin (cfs)	9,670	9,690	9,760	10,170	10,210	10,460	11,270
Stream Bank Erosion (tons)	1,000	1,030	1,150	1,380	1,460	1,550	1,680
Surface Erosion (tons)	320	310	290	250	240	230	210
Total Annual Sediment Loss (tons)*	1,320	1,340	1,440	1,630	1,700	1,780	1,890
% Increase from Baseline Conditions†	0	2	9	23	29	35	43

* Total annual sediment loss is calculated by summing stream bank erosion and surface erosion.

† Percentage represents the increase in total annual sediment loss from baseline conditions.

4.2.1 Analysis Approach and Assumptions

The hydrologic study analyzed surface erosion (from overland sheet flow) and stream bank erosion from the ULVW (from significant flood events). The methods and assumptions used to measure these mechanisms are briefly described below.

Surface Erosion

Using a strategy known as the Simple Method (Schueler 1987), surface erosion (or annual volume sediment loss) was calculated from annual rainfall and from the disposal area to derive the volume of annual runoff. A calibrated value, which had been previously developed for the LVV by Reginato and Piechota (2004), was applied to the volume of runoff. The calibrated values allow the analysis to account for how readily water flows over a given surface and the concentration of fine sediment contained in the runoff.

Assumptions for the surface erosion analyses include the following:

- All areas available for disposal under each of the alternatives assumed the same breakdown of future land uses, which included 65% residential, 20% streets and major roads, 10% commercial, and 5% parks and golf courses. This land use characterization is consistent with existing and future land uses in the vicinity of the CTA study area.
- The remaining lands (that is, those areas within the CTA study area that are not available for disposal) were assumed to be 97% undeveloped (desert) and 3% developed under each of the alternatives.

Stream Bank Erosion

Stream bank erosion occurs as a result of significant flood events. In order to calculate the extent of stream bank erosion under each of the alternatives, rainfall runoff models were created for 2-, 5-, 10-, 25-, 50-, and 100-year storm events using the Hydrologic Engineering Center–1 (HEC-1) software and the Soil Conservation Service's (1975) Curve Number Method. Curve numbers use soil and vegetation conditions to estimate runoff potential. Curve numbers for developed and undeveloped lands account for the type and amount of vegetation coverage and the average percentage of impervious surfaces.

The storm event models described above were then routed through a hydraulic model of the ULVW using the Hydrologic Engineering Center River Analysis System (HEC-RAS). Sediment transport was analyzed in the hydraulic model to estimate the accumulation and displacement of sediment in the ULVW. Sediment surpluses and deficits were tallied at multiple locations within the wash to determine the overall loss for the ULVW. These tallies were summed for each storm event under each alternative and statistically weighted to derive the average annual sediment loss from stream bank erosion.

Baseline Conditions

The rainfall runoff model for existing conditions within the CTA study area yields peak flows of 13,750 cfs for the 100-year flood. As a point of reference (refer to Section 3.3.1, "Surface Water"), a flow rate of 14,000 cfs would cover a football field 1 foot deep in approximately 3.5 seconds. Under baseline conditions, a peak flow of 13,750 cfs within the CTA study area would result in 1,000 tons[2] of total stream bank erosion. In addition, surface erosion causes approximately 320 tons of sediment loss. As a result, the total annual sediment loss from both erosion mechanisms amounts to 1,320 tons.

4.2.2 Impact Thresholds

The LVVDB FEIS defined thresholds for evaluating the significance of an impact to earth resources. These same thresholds are employed in the current CTA analysis, with one addition, which pertains to

[2] The technical study reports the modeling results using scientific notation. For clarity, the output has been converted to tons for the general reader.

modifications to ULVW resulting from efforts to mitigate soil loss. An impact to earth resources is considered significant if it would do the following:

- Substantially alter the topography or ground surface beyond that resulting from natural erosion and deposition;
- Result in substantial soil erosion or loss of topsoil;
- Be located on expansive soils, creating a risk to people or property;
- Expose people or property to hazards involving seismic events or subsidence; or
- Result in modifications to the ULVW as a result of efforts to mitigate soil loss.

4.2.3 Actions Proposed under All Alternatives that Would Cause Change to Earth Resources

The following would cause change to earth resources:

- Conservation measures would be put in place for the protection of surface paleontological sites and sensitive plant habitat.
- BLM would inventory unauthorized surface disturbances in the CTA, including illegal dump sites, user-created trails and tracks, and other trespasses, and would seek to rehabilitate these disturbances to a more natural condition to improve management and protection of sensitive resources.

Direct and Indirect Impacts

GEOLOGY

Situated within Seismic Zone 2B, the CTA study area has moderate potential to be subject to damage during a seismic event. Any construction activities within and adjacent to the CTA would not directly expose people to seismic events. Should an event occur, however, people and infrastructure would be more likely to sustain injuries or damages in developed areas that contain roads and utilities than in undeveloped desert currently within the CTA study area. Structural damage could be minimized by adhering to local design practices, which have stringent building requirements based on the seismic zone. No further mitigation would be required.

Although there is potential for subsidence within the LVV, there have not been any reports documenting subsidence within the CTA study limits. Factors that typically contribute to risk of subsidence include groundwater pumping and mineral extraction. Because neither activity is planned under any of the alternatives and there have been no subsidence incidents reported for the CTA study area or its vicinity, the potential for impacts to future infrastructure resulting from subsidence is considered minimal.

SOILS

Disturbance of native soils could impact the success of sensitive plant species within and adjacent to the ULVW. Disturbed soil also would be more susceptible to erosion during heavy winds and storm events, eventually reaching the Lower Las Vegas Wash and Lake Mead and degrading water quality. According to the USU (2008) soils study, special-status plant species occur primarily in the LVF.

Existing regulations require the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) for construction projects that disturb more than 1 acre. A SWPPP will include measures to address water quality issues such as soil erosion and sedimentation on construction sites from storm

runoff. As discussed in greater detail in Section 4.3, "Water Resources," measures associated with the SWPPP may conflict with BLM goals and objectives to preserve the natural functioning of the wash. The impacts associated with the short-term implementation of the SWPPP likely would be less detrimental to the natural ecosystem of the ULVW, compared with the impacts resulting from polluted runoff entering the wash. Implementation of the SWPPP is not expected to adversely affect the long-term natural functioning of the ULVW.

New development would result in more impervious surfaces within and adjacent to the CTA study limits. As a result, there would be an increase in surface water runoff, which would contribute to the amount of surface and stream bank erosion in the ULVW. The total annual sediment loss resulting only from new development common to all of the alternatives would be expected to be greater than the baseline conditions (1,320 tons) but less than that of Alternative A (1,340 tons).

According to the Clark County Department of Development Services Building Division and as further documented in the 2004 LVVDB FEIS, expansive soils may be present in various locations throughout the CTA study area but are concentrated along the ULVW drainage. Expansive soils have the potential for volume change under changing moisture conditions. As part of standard land development practices, geotechnical studies are typically conducted to characterize local conditions, and engineering solutions are developed to address soil limitations and concerns on a site-by-site basis. Standard geotechnical investigations will identify potential impacts such as expansive soils or concretion and recommend specific measures to address these issues during design and construction.

Mitigation Measures and Unavoidable Adverse Impacts

No mitigation beyond standard construction practices is required. No unavoidable adverse impacts to earth resources are anticipated with the implementation of the actions common to all alternatives.

4.2.4 Alternative A

Actions Proposed under Alternative A that Would Cause Change to Existing Earth Resources

In addition to the actions common to all alternatives, the following action is assumed under Alternative A and would affect earth resources:

- A total of 370.8 acres would be available for disposal and subsequent development.

Direct and Indirect Impacts

GEOLOGY

The CTA study area is in Seismic Zone 2B, which is defined as an area with moderate damage potential from seismic events. Although disposal of land would not directly increase potential exposure of people and property to seismic events, subsequent development activities on disposed lands would create the potential for new properties and people to become exposed to seismic activity and associated damages. However, local building practices for the Cities of Las Vegas and North Las Vegas require structures to be built to the 2006 International Building Code standards, which require more stringent seismic zone standards, thereby minimizing the potential for structural damage. No further mitigation would be needed.

Although the potential exists for subsidence to occur in the LVV, the potential for impacts to future infrastructure and structures within the CTA study area is considered minimal. There have been no

previous reports of subsidence in the CTA study area, and factors that may contribute to subsidence (such as groundwater overpumping and mineral extraction) are not present.

SOILS

The primary impact to soils associated with implementation of this alternative would result from hydrologic changes in ULVW. The hydrologic changes and the resulting changes to erosion rates that would occur within the CTA study area have been described in detail in Section 4.3, "Water Resources."

There are two factors that affect soil erosion under this alternative. As leased and disposed lands are developed, these areas—which would have more impermeable surfaces—would convey a greater amount of runoff, compared with their existing undeveloped state. The increase in runoff has the potential to increase the rate of erosion along natural drainages within the CTA study area and induce increased sedimentation downstream of the CTA study area. The other factor is construction activities, which disturb the surface soils, covering vegetation and causing the soils to be more susceptible to erosion from storm events.

For Alternative A, there is a relatively small amount of land that would be available for disposal and subsequent development. Development of the disposed parcels under this alternative would yield 310 tons of sediment loss annually as a result of surface erosion. Estimated rainfall runoff for Alternative A will generate peak flows of 13,790 cfs for the 100-year flood event, amounting to 1,030 tons of total stream bank erosion. The sediment loss from surface and stream bank erosion mechanisms represents a total annual sediment loss of 1,340 tons, which reflects a 2% increase in annual sediment loss, compared with baseline conditions. This is a relatively minor change in the erosion rate, and no mitigation is required.

Existing regulations require preparation and implementation of a SWPPP for construction projects that disturb more than 1 acre. A SWPPP will include BMPs to reduce issues such as soil erosion and sedimentation on construction sites from storm runoff. While BMPs are intended to reduce impacts of construction-induced soil erosion and sedimentation to ULVW, these same measures could impede the natural occurrences of soil erosion and sedimentation. This would conflict with BLM goals and objectives to protect the natural wash system. However, the effects of construction-induced soil erosion and sedimentation to the wash are expected to be more harmful to the natural ecosystem of the ULVW, compared with the impacts resulting from the short-term implementation of the BMPs. Accordingly, it is not anticipated that the BMPs would disrupt the long-term productivity of the natural system. With the exception of the preparation and implementation of a SWPPP, no mitigation measures would be required.

According to the Clark County Department of Development Services Building Division and as further documented in the 2004 LVVDB FEIS, expansive soils may be present in various locations throughout the CTA study area but are concentrated along the ULVW drainage. Geotechnical studies are typically conducted to characterize local conditions, and engineering solutions are developed to address soil limitations and concerns. Prior to development, standard geotechnical investigations, which will identify potential impacts from expansive soils and subsidence, would be conducted on a site-by-site basis to limit expansive soil impacts.

Mitigation Measures and Unavoidable Adverse Impacts

No mitigation beyond standard construction practices is required. No unavoidable adverse impacts to earth resources are anticipated under this alternative.

4.2.5 Alternative B (BLM Preferred Alternative)

Actions Proposed under Alternative B that Would Cause Change to Existing Earth Resources

Along with the actions common to all alternatives, the following action is assumed under Alternative B and would affect earth resources:

- A total of 2,827.5 acres would be available for disposal and development, including areas north and east of the Paiute Reservation and areas adjacent to DNWR at the northeastern extent of the CTA study area.

Direct and Indirect Impacts

GEOLOGY

Under Alternative B, 2,827.5 acres would be made available for disposal and potential development, compared with 370.8 acres under Alternative A. Although this alternative would result in additional structures and people relocating to an area classified as Seismic Zone 2B, as discussed under Alternative A, adherence to current building standards would minimize any potential effects from seismic events.

Potential impacts from subsidence would be similar to those discussed above under Alternative A.

SOILS

Erosion and sedimentation impacts would be similar to those described under Alternative A; however, because there would be 2,827.5 acres available for disposal, there would be a 1% increase in the rate of erosion in ULVW and sedimentation of downstream reaches. Under this alternative, the rainfall runoff model indicates peak flows of 14,840 cfs for the 100-year flood event, which would yield 1,150 tons of total stream bank erosion. Surface erosion resulting from the limited development in the CTA study area and in the disposed parcels would cause 290 tons of sediment loss, for a total annual sediment loss of 1,440 tons. Compared with baseline conditions, this reflects a 9% increase in sediment loss. The sediment loss from surface and stream bank erosion could alter the natural wash, causing indirect impacts to possible cultural and/or paleontological resources within the ULVW active drainage corridor (see Section 4.5, "Cultural Resources," and Section 4.6, "Paleontological Resources").

Potential impacts involving expansive soils would be similar to those described under Alternative A.

Mitigation Measures and Unavoidable Adverse Impacts

Within their municipal boundaries, the Cities of Las Vegas and North Las Vegas would coordinate with the CCRFCD to implement additional erosion and flood control measures necessary to address increased flood flows and erosion rates resulting from the development of lands disposed of by BLM. The disposal of portions of land upstream of the Decatur detention basin has the potential to increase the magnitude of major flood events in the ULVW, resulting in higher stream bank erosion rates. Development of additional erosion and flood control measures outside the CTA could affect the ecosystem of the ULVW by interfering with the surface water natural flow process. By capturing and/or diverting the surface water natural flow process into specific areas, the configuration and natural functioning of the wash would be changed. This is an unavoidable adverse impact.

4.2.6 Alternative C

Actions Proposed under Alternative C that Would Cause Change to Existing Earth Resources

In addition to the actions common to all alternatives, the following action is assumed under Alternative C and would affect earth resources:

- A total of 6,961.0 acres north and south of the CTA would be available for disposal and development, including areas north and east of the Paiute Reservation.

Direct and Indirect Impacts

GEOLOGY

Under Alternative C, 6,961.0 acres would be made available for disposal and potential development. Although this alternative would result in additional structures and people relocating to an area classified as Seismic Zone 2B, as discussed under Alternative A, adherence to current building standards would minimize any potential effects from seismic events.

Potential impacts from subsidence would be similar to those discussed above under Alternative A.

SOILS

Erosion and sedimentation impacts would be similar in nature to those described under Alternative B. There would be 6,961.0 acres available for disposal under this alternative, which would result in an increase in the rate of erosion in ULVW and sedimentation of downstream reaches. This alternative also allows for potential future development north of the ULVW, which would result in a large increase in sediment loss over Alternative B. Estimated rainfall runoff for this alternative would generate peak flows of 15,960 cfs for the 100-year flood event, amounting to 1,380 tons of total stream bank erosion. Land available for disposal and development under Alternative C would yield 250 tons of sediment loss from surface erosion. This equates to an annual sediment loss of 1,630 tons, which represents a 23% increase in sediment loss, compared with baseline conditions. The sediment loss from surface and stream bank erosion could alter the natural wash, causing indirect impacts to possible cultural and/or paleontological resources within the ULVW active drainage corridor (refer to Section 4.5, "Cultural Resources," and Section 4.6, "Paleontological Resources").

Potential impacts involving expansive soils would be similar to those described under Alternative A but would be potentially greater in magnitude.

Mitigation Measures and Unavoidable Adverse Impacts

Within their municipal boundaries, the Cities of Las Vegas and North Las Vegas would coordinate with CCRFCD to implement additional erosion and flood control measures required to address increased flood flows and erosion rates resulting from the development of lands disposed of by BLM. The disposal of large portions of land upstream of the Decatur detention basin has the potential to increase the magnitude of major flood events in the ULVW, resulting in higher stream bank erosion rates. Additional flood control facilities constructed outside the CTA would affect the natural functioning of the wash by altering the natural migration of surface flows. As described above, anticipated impacts are likely to include alterations to the natural channelization of the ULVW, causing an unavoidable adverse impact.

4.2.7 Alternative D

Actions Proposed under Alternative D that Would Cause Change to Existing Earth Resources

Along with the actions common to all alternatives, the following action is assumed under Alternative D and would affect earth resources:

- A total of 8,022.7 acres would be available for disposal and future development, primarily north and east of the Paiute Reservation and along the northern extent of the CTA study area adjacent to DNWR.

Direct and Indirect Impacts

GEOLOGY

Under Alternative D, 8,022.7 acres would be made available for disposal and potential development. Although this alternative would result in additional structures and people locating to an area classified as Seismic Zone 2B, as discussed under Alternative A, adherence to current building standards would minimize any potential effects from seismic events.

Potential impacts from subsidence would be similar to those discussed above under Alternative A.

SOILS

Erosion and sedimentation impacts would be similar in nature to those described under Alternative B; however, because there would be 8,022.7 acres available for disposal under this alternative, this would result in an increase in the rate of erosion in ULVW and sedimentation of downstream reaches. This alternative also allows for potential future development north of the ULVW, which would result in a large increase in sediment loss, compared with that of Alternative B. Estimated rainfall runoff for this alternative will generate peak flows of 16,490 cfs for the 100-year flood event, amounting to 1,460 tons of total stream bank erosion. Development of the disposed parcels with implementation of this alternative would cause 240 tons of sediment loss, triggering an annual sediment loss of 1,700 tons. Compared with baseline conditions, this reflects a 29% increase in sediment loss. The sediment loss from surface and stream bank erosion could alter the natural wash, causing indirect impacts to possible cultural and/or paleontological resources within the ULVW active drainage corridor (see Section 4.5, "Cultural Resources," and Section 4.6, "Paleontological Resources").

Potential impacts involving expansive soils would be similar to those described under Alternative A but would be potentially greater in magnitude.

Mitigation Measures and Unavoidable Adverse Impacts

Within their municipal boundaries, the Cities of Las Vegas and North Las Vegas would coordinate with the CCRFCD to implement additional erosion and flood control measures required to address increased flood flows and erosion rates resulting from the development of lands disposed of by BLM. The disposal of large portions of land upstream of the Decatur detention basin has the potential to increase the magnitude of major flood events in the ULVW, resulting in higher stream bank erosion rates. Land disposed of in and near the main channel of the ULVW will have the most significant impact to the hydraulic and erosion processes. The future construction of additional flood control facilities outside the CTA could affect the ecosystem of ULVW by disrupting the natural processes related to erosion and

deposition caused by surface water flows. This flow diversion could change the configuration of the natural wash by altering the sediment transport process and could cause an unavoidable adverse impact.

4.2.8 Alternative E

Actions Proposed under Alternative E that Would Cause Change to Existing Earth Resources

In addition to the actions common to all alternatives, the following action is assumed under Alternative E and would affect earth resources:

- A total of 10,010.3 acres would be available for disposal and future development.

Direct and Indirect Impacts

GEOLOGY

Under Alternative E, 10,010.3 acres would be made available for disposal and potential development. Although this alternative would result in additional structures and people locating to an area classified as Seismic Zone 2B, as discussed under Alternative A, adherence to current building standards would minimize any potential effects from seismic events.

Potential impacts from subsidence would be similar to those under Alternative A.

SOILS

Erosion and sedimentation impacts would be similar in nature to those described under Alternative B; however, there would be 10,010.3 acres available for disposal under this alternative, which would result in an increase in the rate of erosion in the ULVW and sedimentation of downstream reaches. This alternative also allows for potential future development north of the ULVW, which would result in a large increase in sediment loss, compared with Alternative B. Estimated rainfall runoff for this alternative will generate peak flows of 16,720 cfs for the 100-year flood event, amounting to 1,550 tons of total stream bank erosion. Land use and development under Alternative E would produce 230 tons of sediment loss from surface erosion. This loss equates to an annual sediment loss of 1,780 tons, which represents a 35% increase in sediment loss, compared with baseline conditions. The sediment loss from surface and stream bank erosion could alter the natural wash, causing indirect impacts to possible cultural and/or paleontological resources within the ULVW active drainage corridor (see Section 4.5, "Cultural Resources," and Section 4.6, "Paleontological Resources").

Potential impacts involving expansive soils would be similar to those described under Alternative A but would be potentially greater in magnitude.

Mitigation Measures and Unavoidable Adverse Impacts

Within their municipal boundaries, the Cities of Las Vegas and North Las Vegas would coordinate with CCRFCD to implement additional erosion and flood control measures required to address increased flood flows and erosion rates resulting from the development of lands disposed of by BLM. The disposal of large portions of land upstream of the Decatur detention basin has the potential to increase the magnitude of major flood events in the ULVW, resulting in higher stream bank erosion rates. Land disposed of in and near the main channel of the ULVW will have the most significant impact to the hydraulic and erosion processes. The future construction of additional flood control facilities outside the CTA could

affect the ecosystem of the ULVW by disrupting the natural processes related to erosion and deposition caused by surface water flows. This flow diversion could change the configuration of the natural wash by altering the sediment transport process and could cause an unavoidable adverse impact.

4.2.9 No-Action Alternative

Actions Proposed under the No-Action Alternative that Would Cause Change to Existing Earth Resources

Along with the actions common to all alternatives, the following action is assumed under the No-Action Alternative and would affect earth resources:

- With the exception of Eglington Preserve and Tule Springs, the remainder of the CTA study area, which amounts to 12,150 acres, would be available for disposal and potential future development.

Direct and Indirect Impacts

GEOLOGY

Under the No-Action Alternative, 12,150 acres would be made available for disposal and potential development. Although this alternative would result in additional structures and people relocating to an area classified as Seismic Zone 2B, as discussed under Alternative A, adherence to current building standards would minimize any potential effects from seismic events.

Potential impacts from subsidence would be similar to those discussed above under Alternative A but would be potentially greater in magnitude.

SOILS

Erosion and sedimentation impacts would be similar in nature to those described under Alternative B; however, because there would be 12,150 acres available for disposal, there would be an increase in the rate of erosion in the ULVW and sedimentation of downstream reaches. This alternative also allows for potential future development north of the ULVW, which would result in a large increase in sediment loss, compared with Alternative B. Estimated rainfall runoff for this alternative will generate peak flows of 17,130 cfs for a 100-year flood event, amounting to 1,680 tons of total stream bank erosion. Development of the disposed parcels with implementation of this alternative would result in 210 tons of sediment loss, which amounts to an annual sediment loss of 1,890 tons. Compared with baseline conditions, this represents a 43% increase in sediment loss.

Potential impacts involving expansive soils would be similar to those described under Alternative A but would be greater in magnitude.

Mitigation Measures and Unavoidable Adverse Impacts

Within their municipal boundaries, the Cities of Las Vegas and North Las Vegas would coordinate with CCRFCD to implement additional erosion and flood control measures required to address increased flood flows and erosion rates resulting from the development of lands disposed of by BLM. The disposal of large portions of land upstream of the Decatur detention basin has the potential to increase the magnitude of major flood events in the ULVW, resulting in higher stream bank erosion rates. Land disposed of in and near the main channel of the ULVW would have the most significant impact to the hydraulic and erosion processes. The future construction of additional flood control facilities outside the CTA could

affect the ecosystem of the ULVW by disrupting the natural processes related to erosion and deposition caused by surface water flows. This flow diversion could change the configuration of the natural wash by altering the sediment transport process and could cause an unavoidable adverse impact.

4.3 WATER RESOURCES

In general, the disposal or lease of BLM lands adjacent to the ULVW would not directly impact surface water, groundwater, or LVV water supply and demand. Indirect impacts to water resources would occur as a result of changes in land use following the disposal or lease and any subsequent development of adjacent lands. Land development on an active alluvial fan and wash system, such as the ULVW, can be problematic because smaller channels feeding into the main wash can behave in a very unpredictable manner with regard to flow direction and capacity during storm events. In addition, developed land can generate higher volumes of runoff as a result of increased impervious surfaces. The developed condition runoff is generally sediment free and discharges in a concentrated fashion at point locations, thus increasing the potential for channel scour in the main wash. Development on the north side of the ULVW on the Sheep Mountain and Las Vegas range fans would be particularly problematic because of the steepness of the alluvial fans. Development to date adjacent to the ULVW, coupled with online detention basins and diversion levees, has altered the stream geomorphology in sections of the ULVW. Because of the wide range of flood flows encountered and the unstable nature of the alluvial fan and wash hydrologic system, it is challenging to engineer land development and drainage improvements that function in a manner that is compatible with the natural wash system.

This section presents an analysis of the potential impacts to surface water with respect to each of the proposed CTA alternatives and the associated lands that would be available for disposal under each of the alternatives (refer to Table 2.4-1 in Chapter 2 for a comparison of the original CTA boundary proposed in the LVVDB FEIS with the SEIS alternatives). Table 4.3-1 provides the water resources impacts for each alternative. Although the BLM Preferred Alternative boundary has been revised to exclude additional lands north of the Paiute Reservation, there were no noticeable changes for water resource impacts.

Table 4.3-1. Comparison of Water Resources Impacts by Alternative

Water Resources	Baseline	A	B (Preferred)	C	D	E	No Action
Alternative Boundary (acres)	13,622.7	12,952.5	10,495.6	6,362.3	5,301.4	3,313.8	1,448.2
100-Year Peak Flow Upstream of Decatur Basin (cfs)	13,750	13,790	14,840	15,960	16,490	16,720	17,130
100-Year Peak Flow Downstream of Decatur Basin (cfs)	9,670	9,690	9,760	10,170	10,210	10,460	11,270
Annual Stream Bank Erosion (tons)	1,000	1,030	1,150	1,380	1,460	1,550	1,680
Annual Surface Erosion (tons)	320	310	290	250	240	230	210
Total Annual Sediment Loss (tons)*	1,320	1,340	1,440	1,630	1,700	1,780	1,890
% Increase from Baseline Conditions†	0	2	9	23	29	35	43
100-Year Floodplain (acres)	841	842	864	883	891	895	904

* Total Annual Sediment Loss is calculated by summing stream bank erosion and surface erosion.

† Percentage represents the increase in total annual sediment loss from baseline conditions.

4.3.1 Analysis Approach and Assumptions

To characterize the potential impacts to surface water, Kleinfelder (2009) prepared a study to develop a comparative analysis of the effects of each land disposal alternative on the ULVW (Appendix L). Because

of the complexity of the hydrologic and erosive mechanisms at work in the CTA study area, the results of the study presented are comparative and should be considered qualitatively. The study identified three indicators for quantifying surface water impacts: surface erosion (from overland sheet flow), stream bank erosion from the ULVW (from significant flood events), and change in the area of the 100-year floodplain. The methods and assumptions used to measure each of the three indicators are briefly described below. Appendix L presents a more detailed discussion of each mechanism, along with supporting equations.

Surface Erosion

Surface erosion, which is measured by the annual volume of sediment loss, was calculated using the Simple Method (Schueler 1987). The Simple Method uses annual rainfall and the disposal area to measure the volume of annual runoff. Calibrated surface erosion values were then applied to the volume of annual runoff. The calibrated values account for how readily water flows over a given surface and the concentration of fine sediment contained in the runoff. Each land use was assigned a calibrated value that had been previously developed for the LVV (Reginato and Piechota 2004), and these values remained constant for all alternatives.

Assumptions for the surface erosion analyses include the following:

- The lands in each CTA alternative boundary were assumed to be 97% undeveloped (desert) and 3% developed.

Stream Bank Erosion

Stream bank erosion occurs as a result of significant flood events. Storm events for this modeling are described in terms of their frequency and probability of occurrence. For example, a 100-year storm event is one that would occur on average once every 100 years and has a 1% probability of occurring during any given year. In order to calculate the extent of stream bank erosion under each of the alternatives, rainfall runoff models were created for 2-, 5-, 10-, 25-, 50-, and 100-year storm events. The runoff models were developed in the HEC-1 software using the Soil Conservation Service's (1975) Curve Number Method, which is applicable to urbanizing watersheds. Curve numbers use soil and vegetation conditions to estimate runoff potential. Curve numbers for developed and undeveloped lands account for the type and amount of vegetation coverage and the average percentage of impervious surfaces. In general, the more impervious surface area, the higher the curve number. More impervious surfaces from future development will result in increased surface runoff and higher peak flows in the ULVW.

The storm event models described above were then routed through a hydraulic model of the ULVW using the HEC-RAS. The HEC-RAS hydraulic model includes two reaches previously modeled: one upstream and one downstream of the ULVW detention basin (also referred to as the Decatur detention basin). Sediment transport was analyzed in the hydraulic model to estimate the accumulation and displacement of sediment in the wash. Sediment surpluses and deficits were tallied at multiple locations within the wash to determine the overall loss for the upstream and downstream reaches. These tallies were summed for each storm event under each alternative. In order to present the results as an annual average, the totals were then statistically weighted to derive the average annual sediment loss from stream bank erosion. Excepting stream flow, all the calculations used variables consistent with each alternative to maintain a comparative approach. It should be noted that the 100-year peak flow, as opposed to the 2-, 5-, 10-, 25-, or 50-year flows, is presented in the following analyses because it represents the most extreme scenario modeled in this study.

100-Year Floodplain

To quantify the changes in the 100-year floodplain, wash geometry and elevation data were obtained from the USU mapping data to create a single continuous hydraulic model for the entire length of the ULVW within the CTA boundary. The peak flows from the rainfall runoff models were used in conjunction with the hydraulic model to estimate the 100-year floodplain area within the CTA study area under each alternative. The peak flows and floodplain extent reflect the hydrologic modeling methods described above and only include existing flood control facilities. For this analysis, the water surface area for each alternative within the CTA boundary was calculated and tabulated in Table 4.3-1.

Baseline Conditions

The ULVW is an ephemeral wash that flows intermittently during and immediately after significant storm events. The upper subbasins flowing into the ULVW are classified geomorphologically as alluvial fans and consist of material ranging in size from boulders to silts. An alluvial fan is a fan-shaped collection of loose or unconsolidated sediments that have been deposited by stream flow or debris flows at the base of a mountain front or valley side (National Research Council 1996). A bajada is formed when multiple neighboring fans converge into a single apron at the base of the slope. Flooding on alluvial fans is typically shallow in depth and can occur quickly. Flow paths on fans typically form a braided network of stream channels, both active and inactive. These channels tend to be more incised with coarser-grained alluvium near the mouth of the fan where the slope is greater. As the slope on the fan decreases, typically due to a topographic break, the flow spreads out laterally into other channels and sheet flow with more fine-grained sediments. The ULVW can experience radical changes in shape, alignment, depth, and flood-carrying capacity during major storm events.

The rainfall runoff model for existing conditions within the study limits yields peak flows of 13,750 cfs for the 100-year flood. As a point of reference (refer to Section 3.3.1, "Surface Water"), a flow rate of 14,000 cfs would cover a football field 1 foot deep in approximately 3.5 seconds. Under baseline conditions, a peak flow of 13,750 cfs within the CTA study area would result in 1,000 tons[3] of total stream bank erosion. In addition, surface erosion causes approximately 320 tons of sediment loss. As a result, the total annual sediment loss from both erosion mechanisms amounts to 1,320 tons. A standard, tandem-axle dump truck has a capacity that approaches 20 tons. Currently, the CTA study area loses enough sediment each year to fill 66 of these dump trucks.

With a peak flow of 13,750 cfs, the 100-year floodplain within the CTA study area covers approximately 841 acres. This acreage encompasses the sum of the peak flows for the upstream and downstream reaches on either side of the Decatur detention basin. Currently, the ULVW is controlled by an east-west diversion berm upstream of the Decatur detention basin. Under all of the alternatives, a 100-year flood would not overtop the berm.

4.3.2 Impact Thresholds

The LVVDB FEIS previously defined significance thresholds for evaluating whether disposal of BLM lands would have a significant impact to water resources. These thresholds remain applicable for the current CTA analysis. The disposal and subsequent development of BLM lands would impact water resources if these actions would do the following:

- Substantially alter the existing drainage pattern of the area, including altering the course of a stream or wash in a manner that would result in accelerated erosion or siltation;

[3] The technical study reports the modeling results using scientific notation. For clarity, the output has been converted to tons for the general reader.

- Substantially alter the existing drainage pattern of the area, including increasing the rate or amount of surface runoff in a manner that would result in flooding;
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Substantially degrade water quality; or
- Place structures that would impede or redirect flood flows within a 100-year flood hazard area.

In addition to the thresholds described above, BLM management objectives emphasize preserving the ecosystem of the ULVW and its natural processes. Accordingly, impacts to the natural functioning of the wash also will be **considered significant if they are not compatible with BLM management goals and objectives.**

4.3.3 Actions Proposed under All Alternatives that Would Cause Change to Water Resources

The following would cause change to water resources:

- BLM would inventory unauthorized surface disturbances in the CTA, including illegal dump sites, user-created trails and tracks, and other trespasses, and would seek to rehabilitate these disturbances to a more natural condition to improve management and protection of sensitive resources.

Direct and Indirect Impacts

SURFACE WATER

Ground-disturbing activities would result in loose, unstable soil. By way of wind and water erosion, these loose sediments would enter ULVW and degrade water quality. General restoration activities also could result in minor fuel and oil spills during the operation and maintenance of equipment and vehicles. Depending on the nature and extent of the spill, there is the potential for the releases to reach surface waters and groundwater, which could also degrade water quality.

Water quality is regulated by local, state, and federal regulations, which require construction projects that disturb more than 1 acre to develop and implement a SWPPP. The SWPPP identifies construction and postconstruction measures, known as BMPs, to reduce pollutants in construction runoff. Implementation of the BMPs would prevent stormwater pollution from degrading water quality.

BMPs implemented to prevent the degradation of water quality also could impede surface flows into the ULVW. These BMPs, however, would be a short-term, necessary measure for preventing additional sources of pollutant runoff into the wash. Stormwater pollution entering the ULVW would be expected to have more detrimental effects on the natural ecosystem of the wash, compared with impacts resulting from the short-term implementation of the BMPs. Accordingly, it is not anticipated that the BMPs would interrupt the long-term productivity of the natural system.

Potential flood control projects would affect ULVW by altering the velocity of the flow near the basin, which would, in turn, modify the way in which sediment is transported within the natural system. Over time, changes in sediment transport could affect characteristics of the wash, such as its shape, depth, and channelization. The extent of these effects cannot be determined at this time.

Flows originating from the DNWR that are not intercepted by engineered improvements (e.g., roads) will flow unimpeded and naturally toward the ULVW.

Mitigation Measures and Unavoidable Adverse Impacts

BMPs, such as SWPPPs and discharge permits, will be implemented for all alternatives prior to and during construction activities to minimize adverse environmental impacts.

4.3.4 Alternative A

Actions Proposed under Alternative A that Would Cause Change to Water Resources

In addition to the actions described above, the following action is assumed under Alternative A and would affect water resources:

- A total of 370.8 acres would be available for disposal and subsequent development.

Direct and Indirect Impacts

SURFACE WATER

The rainfall runoff model developed for Alternative A generates peak flows of 13,790 cfs for the 100-year flood event, which amounts to 1,030 tons of total stream bank erosion. Development of the disposed parcels under Alternative A would yield 310 tons of sediment loss as a result of surface erosion. The sediment loss from surface and stream bank erosion mechanisms represents a total annual sediment loss of 1,340 tons, which reflects a 2% increase in annual sediment loss, compared with baseline conditions. Because Alternative A generates a peak flow that is similar to existing conditions, the area of the 100-year floodplain would slightly increase to 842 acres.

Surface and stream bank erosion would alter the natural wash and also could have indirect impacts to cultural or paleontological resources within the ULVW active drainage corridor (refer to Section 4.5, "Cultural Resources and Traditional Cultural Properties," and Section 4.6, "Paleontological Resources"). In addition, potential future actions within the active wash could be destroyed during flood events.

With this alternative, the hydrologic and erosive processes in the CTA study area would behave in a manner that is similar to existing conditions. Natural erosion and depositional processes would be maintained, and the ULVW ecosystem would continue to function largely as it does currently. There is no anticipated cut-off of flow from the Las Vegas and Sheep Mountain ranges under this alternative. Proposed development plans for areas near the ULVW banks would be subject to an engineering analysis to determine appropriate stability and erosion setback distances. Because there would not be a substantial change in sediment loss or the 100-year floodplain, the need for additional flood control facilities or erosion control measures would be minimized. No mitigation measures would be required.

Construction activities within the CTA and ground disturbance related to development of the disposed lands could result in loose, unstable soil. Without stabilization, loose sediments could be carried by wind or water into the ULVW (eventually reaching Lake Mead), thereby increasing turbidity and degrading water quality. Construction activities also could result in minor fuel and oil spills during the operation and maintenance of equipment and vehicles. Depending on the nature and extent of the spill, there is the potential for the releases to reach surface waters and groundwater, which could degrade water quality.

Local, state, and federal regulations dictate measures for protecting water quality, including the preparation and implementation of a SWPPP for construction projects that disturb more than 1 acre. The SWPPP would identify appropriate construction and postconstruction BMPs to reduce pollutants in runoff from construction sites. Implementation of the BMPs would prevent stormwater pollution from impacting water quality. With the exception of the preparation and implementation of a SWPPP, which is a required component of the regulatory framework, no mitigation measures would be required.

BMPs implemented for future construction projects may temporarily conflict with BLM goals and objectives to protect the natural wash system. While the BMPs are intended to prevent the degradation of water quality, these same measures also could impede surface flows from entering the ULVW. The effects of pollutants reaching the wash, however, are expected to be more harmful to the natural ecosystem of ULVW, compared with the impacts resulting from the short-term implementation of the BMPs. Accordingly, it is not anticipated that the BMPs would disrupt the long-term productivity of the natural system.

Mitigation Measures and Unavoidable Adverse Impacts

In order to satisfy BLM management objectives and maintain a natural stormwater runoff volume, rate, or quality in the wash between pre- and postconstruction conditions under Alternative A, measures would have to be conducted to reduce increased flows from developed areas. This could be done through measures such as detention ponds, rain gardens, pervious pavement, and subsurface detention facilities. However, complete retention may have adverse impacts to vegetation and natural erosion processes in and near the wash as a result of the decreased amount of water. Some of the water from developed areas could be detained and directed to the wash in a manner that mitigates erosion and reduces the magnitude of this impact, such as through impact basins, outlet riprap, and numerous smaller outlet pipes (vs. a single large outlet). In addition, construction in utility and roadway ROWs could have an adverse impact to erosion processes on the bajada. Provided that mitigation measures are properly implemented, there would be no unavoidable adverse impacts to water resources under this alternative.

4.3.5 Alternative B (BLM Preferred Alternative)

Actions Proposed under the Preferred Alternative that Would Cause Change to Water Resources

Along with the actions common to all alternatives, the following action is assumed under the Preferred Alternative and would affect water resources:

- A total of 2,827.5 acres would be available for disposal and development, including areas north and east of the Paiute Reservation and areas adjacent to the DNWR at the northeastern extent of the CTA study area.

Direct and Indirect Impacts

SURFACE WATER

Under the Preferred Alternative, the rainfall runoff model indicates peak flows of 14,840 cfs for the 100-year flood event, which would yield 1,150 tons of total stream bank erosion. Surface erosion resulting from the limited development within the CTA study area and disposed land would cause 290 tons of sediment loss. East-west road alignments constructed on the bajada north of the ULVW will intercept sheet and shallow swale flows from the Las Vegas and Sheep Mountain range fan formations (both active and inactive surfaces) within the CTA study area and concentrate those at fewer discharge points unless

special designs are undertaken to maintain the dispersed nature of the flow under baseline conditions. New development within the ULVW would adversely impact the natural processes if significant fill or numerous obstructions (e.g., bridge piers) are placed within the wash. The total annual sediment loss from surface and stream bank erosion would be 1,440 tons. Compared with baseline conditions, this reflects a 9% increase in sediment loss. A higher peak flow associated with the Preferred Alternative would contribute to a larger 100-year floodplain. Under this alternative, the floodplain expands to 864 acres, which is a 3% increase, compared with baseline conditions. The hydrologic and erosive processes associated with the implementation of the Preferred Alternative would yield increases in sediment loss and the 100-year floodplain.

Over time, increases in surface and stream bank erosion would alter aspects of the natural wash, specifically its shape, direction, and depth, along with the carrying capacity of the flow (Kleinfelder 2009). The greater surface and stream bank erosion under the Preferred Alternative also would increase the potential for removing or burying cultural or paleontological deposits (refer to Section 4.5, "Cultural Resources and Traditional Cultural Properties," and Section 4.6, "Paleontological Resources"). Proposed development plans for areas near the ULVW banks would be subject to an engineering analysis to determine appropriate stability and erosion setback distances. Other indirect impacts associated with the Preferred Alternative include the destruction or erosion of constructed recreational trails and minor fuel and oil spills during the operation and maintenance of construction equipment and vehicles. Oil and fuel releases could degrade water quality if they reach surface waters or groundwater. Ground-disturbing activities within the CTA study area or disposed parcels could result in loose, unstable soil. These loose sediments could enter surface waters and degrade water quality.

For construction projects that affect more than 1 acre, the preparation and implementation of a SWPPP would be required to prevent impacts to water quality. The SWPPP would identify appropriate construction and postconstruction BMPs to reduce pollutants in runoff from construction sites. Implementation of the BMPs would prevent stormwater pollution from impacting water quality. No additional mitigation measures would be required.

As described under Alternative A, some BMPs may conflict with BLM goals and objectives to protect the natural processes of the wash. Because these BMPs would be short term and are a necessary measure for preventing pollutant runoff into the wash, implementation of the SWPPP would not interrupt the long-term functioning of the natural wash system.

Mitigation Measures and Unavoidable Adverse Impacts

To address potential water quality impacts associated with the Record of Environmental Consideration, BLM recommends that an assessment of the site be conducted to determine whether hazardous materials are present within the CTA study area. If hazardous materials are encountered, BLM recommends remediation of the materials prior to the disposal or leasing of the parcels.

Within their municipal boundaries, the Cities of Las Vegas and North Las Vegas would coordinate with CCRFCD to implement additional erosion and flood control measures required to address increased cumulative flood flows and erosion rates resulting from the development of lands disposed of by BLM.

The future construction of additional flood control facilities outside the CTA could affect the ecosystem of the ULVW by disrupting the natural processes related to surface water flows. Although the extent of the impact cannot be determined at this time, flood control structures typically affect surface flows by capturing and/or diverting flows into specific areas. Over time, this diversion could change the configuration and natural functioning of the wash. This is an unavoidable adverse impact.

4.3.6 Alternative C

Actions Proposed under Alternative C that Would Cause Change to Water Resources

In addition to the actions common to all alternatives, the following action is assumed under Alternative C and would affect water resources:

- A total of 6,960.9 acres north and south of the CTA would be available for disposal, including areas north and east of the Paiute Reservation.

Direct and Indirect Impacts

SURFACE WATER

The rainfall runoff model developed for Alternative C produces peak flows of 15,960 cfs for the 100-year flood event. As a result, 1,380 tons of sediment will be lost as a result of stream bank erosion. Land use and development under Alternative C also would yield 250 tons of sediment from surface erosion. Therefore, the total annual sediment loss from surface and stream bank erosion is 1,630 tons, which represents a 23% increase in sediment loss, compared with baseline conditions. With a peak flow of 15,960 cfs, the 100-year floodplain under Alternative C would encompass 883 acres, which is a 5% increase from the existing floodplain configuration.

The hydrologic and erosive processes in the CTA study area would produce larger flows and greater stream bank erosion under Alternative C. These amplified erosion mechanisms have greater potential to reconfigure the natural wash and to bury or erode sensitive cultural or paleontological resources (refer to Section 4.5, "Cultural Resources and Traditional Cultural Properties," and Section 4.6, "Paleontological Resources"). Under this alternative, there would be a greater need for erosion control measures in the wash to protect sensitive areas. Construction activities would also affect the natural functioning of the fan and wash systems by altering surface flows. Proposed development plans for areas near the ULVW banks would be subject to an engineering analysis to determine appropriate stability and erosion setback distances. In addition, the increase in the 100-year floodplain would require the construction of additional flood control structures to protect surrounding property and infrastructure. The introduction of flood control structures would affect the natural erosional processes within the wash.

Because there is more land available for disposal under this alternative, construction activities associated with the development of the disposed land would have greater potential to result in minor fuel and oil spills during construction activities. These spills have the potential to reach surface waters and groundwater, which could impact water quality. Ground-disturbing activities associated with allowable uses within the CTA study area or with development of the disposed parcels could loosen topsoil. These loose sediments could enter surface waters and degrade water quality.

The preparation and implementation of a SWPPP would be required for all projects that disturb more than 1 acre to prevent impacts to water quality. The SWPPP would identify appropriate BMPs to reduce pollutants in runoff from construction sites, thereby preventing stormwater pollution from impacting water quality.

BMPs implemented for future construction projects may be incompatible with the objectives pertaining to the protection of the natural processes of ULVW as outlined in the BLM managerial and environmental concerns. BMPs designed to prevent the degradation of water quality also could impede surface flow into the ULVW. Stormwater runoff entering ULVW would be more harmful to the ecosystem of the wash, compared with impacts resulting from the short-term implementation of the BMPs. As a result,

implementing the BMPs to prevent construction pollutants from entering the wash is not expected to disrupt the long-term productivity of the natural system.

Urban development, particularly on the bajada north of the ULVW, would require flood protection measures that have the potential to significantly alter the natural surface drainage processes in and near the ULVW. Likewise, land development would result in higher runoff peak flows and volumes because of impervious surfaces and would likely discharge into the ULVW in a concentrated manner at storm sewer outfalls.

Implementation of Alternative C would contribute to erosion and sedimentation processes within the CTA study area and in downstream reaches of the ULVW. Mitigation measures would be required to reduce the magnitude of cumulative erosion and sedimentation impacts.

Mitigation Measures and Unavoidable Adverse Impacts

To address potential water quality impacts associated with the Record of Environmental Consideration, BLM recommends that an assessment of the site be conducted to determine whether hazardous materials are present within the CTA study area. If hazardous materials are encountered, BLM recommends remediation of the materials prior to the disposal or leasing of the parcels.

Within their municipal boundaries, the Cities of Las Vegas and North Las Vegas would coordinate with CCRFCD to implement flood control measures, as appropriate, to address higher peak flows and erosion mechanisms within the ULVW. These measures could include modifications to the design of bridges, culverts, diversion berms, and other structures in the ULVW to accommodate larger flood events.

Additional flood control facilities constructed outside the CTA would affect the natural functioning of the wash by altering the velocity and natural migration of surface flows. The extent of the impact to the wash resulting from the construction of flood control structures outside the CTA cannot be determined at this time, but anticipated impacts are likely to include considerable alterations to the shape, depth, and channelization of the ULVW. This is an unavoidable adverse impact.

Construction activities would have a short-term impact to wash hydraulic and erosion/deposition processes. These would be considered unavoidable adverse impacts.

4.3.7 Alternative D

Actions Proposed under Alternative D that Would Cause Change to Water Resources

Along with the actions common to all alternatives, the following action is assumed under Alternative D and would affect water resources:

- A total of 8,022.7 acres would be available for disposal and future development, primarily north and east of the Paiute Reservation and along the northern extent of the CTA study area, adjacent to DNWR.

Direct and Indirect Impacts

SURFACE WATER

Under Alternative D, the rainfall runoff model generates peak flows of 16,490 cfs for the 100-year flood event, which would yield 1,460 tons of stream bank erosion. Development of the disposed parcels with

implementation of this alternative would result in 240 tons of sediment loss from surface erosion, for a total annual sediment loss of 1,700 tons. Compared with baseline conditions, this reflects a 29% increase in sediment loss. A higher peak flow associated with Alternative D would contribute to a broader 100-year floodplain. Under this alternative, the floodplain would expand to 891 acres, which is a 6% increase, compared with existing conditions.

Under Alternative D, the hydrologic mechanisms in the CTA study area would produce larger flows, which would increase the amount of surface and stream bank erosion. Increased erosion would have a greater potential to affect the natural functioning of the wash and to impact cultural or paleontological resources (refer to Section 4.5, "Cultural Resources and Traditional Cultural Properties," and Section 4.6, "Paleontological Resources"). Compared with the other alternatives, there would be a greater need for erosion control measures in ULVW to protect sensitive areas. Although additional flood control facilities would accommodate larger flows and reduce erosion downstream by slowing the flow, these measures would also considerably alter the natural erosional and depositional processes within the wash.

Because there is more land available for disposal under this alternative, construction activities associated with the development of the disposed parcels would have greater potential to result in minor fuel and oil spills during the operation and maintenance of equipment and vehicles. Water quality could be degraded if the releases reach surface waters or groundwater. Other impacts to water quality could include sediment entering surface waters as a result of ground-disturbing activities.

To prevent impacts to water quality, the preparation and implementation of a SWPPP would be required for all construction projects that disturb more than 1 acre. The SWPPP would identify BMPs to prevent stormwater pollution by reducing pollutants in runoff from construction sites. As previously described, some of the BMPs implemented to address stormwater runoff from construction sites may conflict with BLM goals and objectives to protect the natural processes of the wash. Because these BMPs would be short term and are a necessary measure for preventing pollutant runoff into the wash, it is anticipated that the BMPs would not interrupt the long-term functioning of the natural wash system.

Urban development, particularly on the bajada north of the ULVW, would require flood protection measures that have the potential to significantly alter the natural surface drainage processes in and near the ULVW. Likewise, land development would result in higher runoff peak flows and volumes because of impervious surfaces and would likely discharge into the ULVW in a concentrated manner at storm sewer outfalls.

Mitigation Measures and Unavoidable Adverse Impacts

Prior to disposal, BLM recommends that a site assessment be conducted to determine whether hazardous materials are associated with the Record of Environmental Consideration. If hazardous materials are identified, BLM recommends that remediation activities be conducted to remove the materials from the site.

In cooperation with CCRFCD, the Cities of Las Vegas and North Las Vegas would implement erosion and flood control measures within the ULVW, as appropriate, to address increased cumulative flood flows and erosion rates resulting from the development of lands disposed of by BLM.

The future construction of additional flood control facilities outside the CTA could affect the ecosystem of the ULVW by disrupting the natural processes related to erosion and deposition caused by surface water flows. Although the extent of the impact cannot be determined at this time, flood control structures typically affect surface flows by capturing and/or diverting flows into specific areas. Over time, this flow diversion could change the configuration of the natural wash by altering the sediment transport process. This is an unavoidable adverse impact.

4.3.8 Alternative E

Actions Proposed under Alternative E that Would Cause Change to Water Resources

In addition to the actions common to all alternatives, the following action is assumed under Alternative E and would affect water resources:

- A total of 10,010.3 acres would be available for disposal and future development.

Direct and Indirect Impacts

SURFACE WATER

The rainfall runoff model developed for Alternative E produces peak flows of 16,720 cfs for the 100-year flood event. As a result, 1,550 tons of sediment will be lost as a result of stream bank erosion. Land use and development under Alternative E would generate 230 tons of sediment loss from surface erosion. Therefore, the total annual sediment loss from surface and stream bank erosion is 1,780 tons, which represents a 35% increase in sediment loss, compared with baseline conditions. With a peak flow of 16,720 cfs, the 100-year floodplain under Alternative E would encompass 895 acres, which is a 6% increase from the existing floodplain configuration.

Like the other alternatives, indirect impacts related to surface water under Alternative E could include impacts to cultural or paleontological resources, in particular erosion of the sensitive LVF (refer to Section 4.5, "Cultural Resources and Traditional Cultural Properties," and Section 4.6, "Paleontological Resources"). More substantial surface and stream bank erosion under Alternative E also would involve considerable impacts to the natural functioning of the wash and would create a greater need for flood and erosion control measures in the ULVW to protect sensitive areas, including surrounding property and infrastructure. Pursuant to FEMA requirements, residential development could not occur within the expanded floodplain.

Because there would be more land available for disposal under this alternative, there would be a greater potential for minor fuel and oil spills during construction activities. Ground-disturbing activities also could result in loose, unstable soil, which could also contribute to water quality degradation.

For construction projects that affect more than 1 acre, the preparation and implementation of a SWPPP would be required to prevent impacts to water quality. The SWPPP would identify appropriate construction and postconstruction BMPs to reduce pollutants in runoff from construction sites. Implementation of the BMPs would prevent stormwater pollution from impacting water quality.

BMPs implemented for future construction projects may be incompatible with BLM's priority to protect the natural processes of the ULVW as outlined in its managerial and environmental concerns. BMPs designed to prevent the degradation of water quality also could impede surface flow into the ULVW. Stormwater pollutants entering the ULVW would be more damaging to the ecosystem of the wash than the impacts resulting from the short-term implementation of the BMPs. As a result, the prevention of stormwater runoff into the wash through the use of BMPs is not expected to disrupt the long-term productivity of the natural system.

Urban development, particularly on the bajada north of the ULVW, would require flood protection measures that have the potential to significantly alter the natural surface drainage processes in and near the ULVW. Likewise, land development would result in higher runoff peak flows and volumes because of

impervious surfaces and would likely discharge into the ULVW in a concentrated manner at storm sewer outfalls.

Mitigation Measures and Unavoidable Adverse Impacts

To address potential water quality impacts associated with the Record of Environmental Consideration, BLM recommends that an assessment of the site be conducted to determine whether hazardous materials are present within the CTA study area. If hazardous materials are encountered, BLM recommends remediation of the materials prior to disposal or leasing of the parcels.

Within their municipal boundaries, the Cities of Las Vegas and North Las Vegas would coordinate with CCRFCD to implement flood control measures, as appropriate, to address higher peak flows and erosion mechanisms within the ULVW. These measures could include modifications to the design of bridges, culverts, diversion berms, and other structures in the ULVW.

Additional flood control facilities constructed outside the CTA study area would affect the natural functioning of the wash by altering the velocity and natural migration of surface flows. The extent of the impacts to the wash resulting from the construction of flood control structures outside the CTA study area cannot be determined at this time, but anticipated impacts likely would include considerable alterations to the shape, depth, and channelization of ULVW. This is an unavoidable adverse impact.

4.3.9 No-Action Alternative

Actions Proposed under the No-Action Alternative that Would Cause Change to Water Resources

Along with the actions common to all alternatives, the following actions are assumed under the No-Action Alternative and would affect water resources:

- Excepting Eglington Preserve and Tule Springs, the remainder of the CTA study area, which amounts to 12,150 acres, would be available for disposal.
- Additional flood control needs would be evaluated on a case-by-case basis.

Direct and Indirect Impacts

SURFACE WATER

Under the No-Action Alternative, the rainfall runoff model produces peak flows of 17,130 cfs for the 100-year flood event, which would yield 1,680 tons of total stream bank erosion. Development of the disposed parcels with implementation of this alternative would result in 210 tons of sediment loss from surface erosion, which amounts to an annual sediment loss of 1,890 tons. Compared with baseline conditions, this represents a 43% increase in sediment loss. Under the No-Action Alternative, the floodplain would expand to 904 acres, which is a 7% increase from existing conditions.

Like the other alternatives, indirect impacts related to surface water under the No-Action Alternative would include impacts to cultural and/or paleontological resources, including the highly sensitive LVF (refer to Section 4.5, "Cultural Resources and Traditional Cultural Properties," and Section 4.6, "Paleontological Resources"). Based on the surface water models, the No-Action Alternative would be subject to the most stream bank erosion, compared with the other alternatives. Consequently, the ULVW also would be subject to the most extreme changes in its natural functioning under this alternative. The No-Action Alternative would generate the largest flows and would therefore have the greatest need for

flood control facilities and erosion control measures to accommodate the expanded 100-year floodplain and protect sensitive areas, surrounding property, and infrastructure. Under the No-Action Alternative, additional needs for flood control would be evaluated and allowed on a case-by-case basis. These facilities would affect natural erosion and depositional processes associated with surface water flows.

Compared with the other alternatives, the greatest amount of land would be available for disposal under the No-Action Alternative. As a result, construction activities associated with the development of the disposed parcels would have more potential to result in minor fuel and oil spills during the operation and maintenance of equipment and vehicles. These spills have the potential to reach surface waters and groundwater, which could impact water quality. Ground-disturbing activities associated with allowable uses within the CTA or with development of the disposed parcels could loosen topsoil. These loose sediments could enter surface waters, increasing turbidity and degrading water quality.

To prevent impacts to water quality, the preparation and implementation of a SWPPP would be required for all projects that disturb more than 1 acre. The SWPPP would identify appropriate BMPs to reduce pollutants in runoff from construction sites, thereby preventing stormwater pollution from impacting water quality.

As previously described, some of the BMPs implemented to address stormwater runoff from construction sites may conflict with BLM goals and objectives to protect the natural processes of the wash. Given the amount of land available for disposal under the No-Action Alternative, the BMPs would be a necessary measure for preventing pollutant runoff into the wash. Because the BMPs would be short term in nature, they are not expected to interrupt the long-term functioning of the natural wash system.

Urban development, particularly on the bajada north of the ULVW, would require flood protection measures that have the potential to significantly alter the natural surface drainage processes near and in the ULVW. Likewise, land development would result in higher runoff peak flows and volumes because of impervious surfaces and would likely discharge into the ULVW in a concentrated manner at storm sewer outfalls.

Mitigation Measures and Unavoidable Adverse Impacts

To address potential water quality impacts associated with the Record of Environmental Consideration, BLM recommends that an assessment of the site be conducted to determine whether hazardous materials are present within the CTA study area. If hazardous materials are encountered, BLM recommends remediation of the materials prior to disposal or leasing of the parcels.

As described in Section 2.4.6, "No-Action Alternative," additional flood control needs would be evaluated on a case-by-case basis. Within their municipal boundaries, the Cities of Las Vegas and North Las Vegas, in coordination with CCRFCD, would implement erosion and flood control measures within the ULVW to address increased cumulative flood flows and erosion rates resulting from the development of lands disposed of by BLM.

The future construction of additional flood control facilities would affect the ecosystem of the ULVW by disrupting the natural processes related to surface water flows. Although the extent of the impacts cannot be determined at this time, flood control structures typically affect surface flows by capturing and/or diverting flows into specific areas. Over time, this diversion and slowing of the flow could change the configuration of the natural wash. This is an unavoidable adverse impact.

4.4 VEGETATION

This section analyzes the anticipated impacts to vegetation resources that would result from six alternatives. Each action alternative would result in different levels of both adverse and beneficial impacts as well as different levels of direct and indirect impacts. Each alternative considers different CTA boundaries, and each would result in habitat conservation. Table 4.4-1 provides a comparison of the habitat conservation acreage that would result under each alternative.

Table 4.4-1. Comparison of Total Acres of Conservation between Alternatives*

Resource	A (acres)	B (Preferred) (acres)	C (acres)	D (acres)	E (acres)	No Action (acres)
Alternative Boundary	12,952.5	10,495.6	6,362.3	5,301.4	3,313.8	1,448.2
General Vegetation Conserved†	12,818.8	10,686.4	5,789.3	4,668.5	2,978.8	1,437.2
Cacti/Yucca Habitat Conserved	10,701.2	8,603.1	3862.3	2911.8	1664.7	597.1
Buckwheat Habitat Conserved	1,044.5	1,040.7	987.8	902.8	899.7‡	729.0‡
Bearpoppy Habitat Conserved	2,462.9	2,458.6	2,314.0‡	1,661.1‡	1,665.2‡	910.2‡

* Total acres conserved = (Total acres available in alternative [plus Eglington Preserve or Tule Springs if outside boundary]) – (Total acres affected by alternative actions).

† Mesquite/acacia habitat occurs within the general vegetation category.

‡ Significant impacts occur because of loss of high-potential or occupied habitat.

4.4.1 Analysis Approach and Assumptions

While locations or alignments for new facilities, utilities, and roads have been proposed, the locations have not been determined. Although their exact locations are unknown, a maximum extent of development has been assumed for analysis. For the purposes of impacts analysis in this section, habitat impacts from assumed actions are measured by the acres of disturbance to different vegetation communities. Because exact location data are not available, it is impossible to determine exactly which vegetation community an action would impact. Therefore, it is assumed that impacts to vegetation communities will occur proportionate to the relative amount of each vegetation community within the alternative boundary.

4.4.2 Impact Thresholds

Through the evaluation of vegetation resources, it was concluded that general vegetation (including cacti/yucca habitat) and special-status plant resources have substantially different thresholds for impacts to become significant. Impacts to these resources are measured on a rangewide scale, resulting in far-reaching ranges for general vegetation communities and narrow ranges for special-status plants.
The presence of the available general vegetation communities within the CTA boundary represents an insignificant amount of those communities relative to their overall abundance. Using the rangewide concept, impacts to general vegetation communities would never reach a level of significance. In contrast, thresholds for special-status plant species are much different because of their importance relative to the purpose and need for this project, as well as their limited distribution and potential for listing under the ESA. Sensitive plant species habitat designations in Section 3.4.3, "Special-Status Plant Species," are described as occupied, high potential, and low potential. Based on the best professional judgment, it was determined that any net unmitigated loss of high-potential and occupied habitat and any loss of known individuals would cause significant adverse impacts to these resources (known individuals are those plants that were identified and documented during preconstruction surveys). It was further determined

that a net unmitigated loss of more than 10% of moderate-potential habitat would lead to significant impacts to these resources. The remaining acreage within the CTA boundary is considered low potential and is unlikely to support buckwheat or bearpoppy because it does not contain the correct soil and/or vegetation communities. Therefore, impacts to special-status plants would not occur from disturbance of low-potential special-status plant species habitat. In the "Cumulative Impacts" section, BLM estimates that past actions have removed up to 80% of known habitat for the Las Vegas buckwheat and the Las Vegas bearpoppy (BLM 2004a).

4.4.3 Actions Common to all Alternatives

The following actions are assumed under all alternatives and would result in impacts to vegetation resources. These actions include the following:

- Conservation measures would be put in place for the protection of surface paleontological sites and sensitive plant habitat.
- BLM would inventory unauthorized surface disturbances in the CTA, including illegal dump sites, user-created trails and tracks, and other trespasses, and would seek to rehabilitate these disturbances to a more natural condition to improve management and protection of sensitive resources.

4.4.4 Alternative A

Alternative A would encompass a total area of 12,952.5 acres (see Figure 2.4-1). An additional 299.4 acres of habitat within Tule Springs (state lands) that occur outside the Alternative A boundary would also be conserved. The 370.8 acres that are within the CTA study area but outside the alternative boundary would ultimately be developed. A total of 133.7 acres of general vegetation would be directly impacted from implementation of these actions (Table 4.4-2), resulting in 12,818.8 acres of total conservation. The acreages provided in Table 4.4-2 will be used to describe impacts to resources resulting from selection of Alternative A.

Direct and Indirect Impacts

VEGETATION COMMUNITIES

Direct, adverse impacts to vegetation communities would result from selection of Alternative A. The total amount of direct impacts from actions under this alternative would be only 1.0% of the total available habitat within Alternative A boundary, which would be a negligible direct impact to general vegetation communities.

Indirect, adverse impacts are anticipated to occur as a result of selecting Alternative A. Construction activities would cause fugitive dust, which would lead to an adverse impact because it lowers primary plant production by reducing photosynthesis (21%–58%), reducing leaf transpiration, reducing leaf area, lowering water use efficiency, and/or increasing leaf temperatures in Mojave Desert shrubs (Sarifi et al. 1997). Whereas development actions under this alternative would be short term, they would also be widespread and substantial. Therefore, for this alternative, fugitive dust from construction activities is expected to have moderate short-term impacts.

Table 4.4-2. Acres of Habitat Conserved under Alternative A

Resource	Alternative Boundary Habitat (acres)	Assumed Disturbance Areas Affecting Vegetation Communities (acres)	Acres Conserved*†
General Vegetation			
Creosote Bush–White Bursage‡	9,368.2	78.2	9,290.0
White Bursage–Shadscale Saltbush	1,038.1	5.6	1,032.5
White Bursage–Creosote Bush Upper Alluvial Fan‡	905.9	11.3	894.6
Creosote Bush	657.1	4.1	653.0
Cattle Saltbush–White Bursage‡	508.4	5.0	503.4
Badlands	218.7	2.6	216.1
Human-Modified Lands	124.1	25.5	98.6
White Bursage–Spiny Menodora	118.8	1.3	117.5
White Bursage–Virgin River Brittlebush‡	13.2	0.0	13.2
Total General Vegetation	**12,952.5**	**133.7**	**12,818.8**
Special-Status Plants			
Las Vegas Buckwheat–Occupied Habitat	125.2	0.2	125.0
Las Vegas Buckwheat–High-Potential Habitat	725.9	4.1	721.8
Las Vegas Buckwheat–Moderate- Potential Habitat	199.3	1.6	197.7
Total Las Vegas Buckwheat Habitat	**1,050.4**	**5.9**	**1,044.5**
Bearpoppy–Occupied Habitat	504.5	3.4	501.1
Bearpoppy–High-Potential Habitat	820.6	5.3	815.3
Bearpoppy–Moderate-Potential Habitat	1,155.3	8.8	1,146.5
Total Bearpoppy Habitat	**2,480.4**	**17.5**	**2,462.9**

* Acres conserved = (Acres available within alternative boundary) – (Acres affected by alternative actions).

† Conservation does not include the 299.4 acres of Tule Springs that would also be conserved.

‡ Vegetation community that includes cacti/yucca low- or high-density habitat.

Selection of Alternative A is anticipated to have substantial direct, long-term, beneficial impacts for the general vegetation communities. These benefits include rehabilitating existing surface disturbance sites by the BLM, conserving general vegetation communities, and providing access to habitat for education and scientific research purposes. It would also have an indirect, long-term, beneficial impact by increasing scientific research and education for desert ecosystems, leading to future conservation efforts.

In conclusion, as shown in Table 4.4-2 and discussed above, impacts to general vegetation communities resulting from selection of Alternative A are not anticipated to reach a level of significance. Removal of vegetation would be limited to a very small amount of the vegetation within the CTA study area, whereas conservation of vegetation would have a substantial beneficial impact to general vegetation communities. Selection of Alternative A is anticipated to provide the largest amount of direct, long-term, beneficial impacts for the general vegetation communities out of the six alternatives because it protects the greatest amount of natural habitat (12,952.5 acres out of the 13,622.7-acre CTA study area = 95.1%) from direct and indirect impacts.

CACTUS AND YUCCA

Alternative A would result in direct, long-term impacts to cactus and yucca from the permanent removal of 89.5 acres (0.9%) of high-density and 5 acres (1%) of low-density habitat from the actions associated

with this alternative. The total amount of direct impacts from actions under this alternative would be only 0.9% of the total available cactus and yucca habitat in Alternative A CTA boundary, which would be a negligible direct impact to cactus and yucca.

Indirect, adverse impacts would be similar to those described for general vegetation, i.e., adverse impacts from increased access, visitation, and fugitive dust. These activities are expected to be minimal and short term, and adverse impacts would be negligible.

Selection of Alternative A is anticipated to have substantial direct, long-term, beneficial impacts for cactus and yucca. These benefits include rehabilitating existing surface disturbance sites by BLM, conserving cactus and yucca habitat, and providing access to habitat for scientific research and educational purposes. Direct, beneficial impacts to cactus and yucca are anticipated through the conservation of 10,701.2 acres of high- and low-density cactus and yucca habitat. It would also have an indirect, long-term, beneficial impact by increasing scientific research and education for cacti and yucca in desert ecosystems, leading to future conservation efforts.

In conclusion, adverse impacts to cactus and yucca resulting under Alternative A would be reduced. As discussed above, removal of cactus and yucca habitat would be negligible, as this is limited to a very small amount of the total cactus and yucca habitat within the CTA boundary. Conservation of 10,701.2 acres of habitat would have a substantial beneficial impact to cactus and yucca. Furthermore, cactus and yucca species are protected under NRS 527.060–527.120 and are therefore required for salvage at the discretion of BLM, which would further reduce the number of cactus and yucca individuals impacted.

SPECIAL-STATUS PLANT SPECIES

Federally Listed and Candidate Plant Species

Las Vegas Buckwheat

Direct, adverse impacts to Las Vegas buckwheat would result from the anticipated removal of 0.2 acre of occupied, 4.1 acres of high-potential, and 1.6 acres of moderate-potential habitat associated with this alternative. All buckwheat habitat would be within the CTA alternative boundary, and there would be no buckwheat habitat in lands available for disposal. The loss of both high-potential and occupied buckwheat habitat would occur, which would lead to a significant impact to buckwheat without implementation of specific mitigation measures. Impacts to moderate-potential habitat would be under the 10% threshold and would not reach a level of significance. Additionally, removal of habitat would result in fragmentation and increased edge effects for populations. Actions are assumed to be extremely limited for this alternative; therefore, habitat removal would be minimal. No other direct impacts to Las Vegas buckwheat are expected from selection of Alternative A.

Indirect, adverse impacts would be similar to those described for general vegetation. These activities are expected to be minimal and short term, and adverse impacts would be negligible.

Alternative A is anticipated to have substantial long-term, beneficial impacts for Las Vegas buckwheat. These benefits include rehabilitating existing surface disturbance sites by BLM, conserving general vegetation communities, protecting sensitive plant habitat, and providing access to habitat for education and scientific research purposes. Additionally, the conservation of 1,044.5 acres of occupied, high-potential, and moderate-potential habitat would have a substantial long-term, beneficial impact to Las Vegas buckwheat by increasing the amount of land conserved and minimizing habitat fragmentation.

In conclusion, as shown in Table 4.4-2 and discussed above, a loss of both high-potential and occupied buckwheat habitat would occur, which would lead to a significant impact to buckwheat without implementation of specific mitigation measures. Less than 10% of moderate-potential habitat would be

lost, and impacts to that habitat type would not reach a level of significance. All impacts to buckwheat habitat occur within the CTA boundary. Implementation of mitigation measures identified in Appendix A would lead to no net unmitigated loss of high-potential and occupied habitat and no loss of known individual plants. Therefore, significant adverse impacts are not anticipated following mitigation, whereas beneficial impacts are anticipated to be substantial.

BLM Special-Status and State of Nevada Protected Plant Species

Las Vegas Bearpoppy and Merriam's Bearpoppy

Direct, adverse impacts to bearpoppy would occur from the anticipated removal of 3.4 acres of occupied, 5.3 acres of high-potential, and 8.8 acres of moderate-potential habitat associated with this alternative. There would be up to 10.2 acres, or 1.0%, of moderate-potential bearpoppy habitat outside the alternative boundary in lands available for disposal. The loss of both high-potential and occupied bearpoppy habitat would occur within the alternative boundary, which would lead to a significant impact to bearpoppy without implementation of specific mitigation measures. Impacts to moderate-potential habitat would be under the 10% threshold and would not reach a level of significance. Impacts from habitat fragmentation would be similar to those discussed above for Las Vegas buckwheat. Fragmentation from actions under this alternative would constitute a minor impact to bearpoppy.

Indirect, adverse impacts would be similar to those described for general vegetation. These activities are expected to be minimal and short term, and adverse impacts would be negligible.

Alternative A is anticipated to have substantial long-term, beneficial impacts for bearpoppy. These benefits include rehabilitating existing surface disturbance sites by the BLM, conserving general vegetation communities, protecting sensitive plant habitat through the exclusion of roads north of Grand Teton Drive and east of Decatur Boulevard, and providing access to habitat for education and scientific research purposes. Additionally, conservation of 2,462.9 acres of occupied, high-potential, and moderate-potential habitat would have a substantial long-term, beneficial impact to bearpoppy by increasing the amount of land conserved and minimizing fragmentation of habitat.

In conclusion, as shown in Table 4.4-2 and discussed above, a loss of both high-potential and occupied bearpoppy habitat would occur, which would lead to a significant impact to bearpoppy without implementation of specific mitigation measures. Less than 10% of moderate-potential habitat would be lost, and impacts to that habitat type would not reach a level of significance. All impacts to bearpoppy high-potential and occupied habitat would occur within the alternative boundary and would be mitigated by measures identified in Appendix A. Therefore, significant adverse impacts are not anticipated following mitigation, whereas beneficial impacts are anticipated to be substantial.

Mitigation Measures and Unavoidable Adverse Impacts

It is assumed there would be loss of up to 133.7 acres of natural vegetation and individual plant species (general and special status) from ground-disturbing activities within the alternative boundary. The current measures listed in the Biological Opinion for the disposal boundary will be implemented. Following implementation of mitigation measures, no significant unavoidable adverse impacts to vegetation or special-status plants are expected from implementation of this alternative.

4.4.5 Alternative B (BLM Preferred Alternative)

Alternative B would encompass a total area of 10,495.6 acres (see Figure 2.4-2). The 2,827.5 acres that are within the CTA study area (adjacent to the Paiute Reservation and along the northeastern boundary of the CTA study area) but outside the Alternative B boundary would ultimately be developed. A total of

321.2 acres of vegetation would be impacted (Table 4.4-3) from actions assumed under Alternative B, resulting in 10,174.4 acres of total conservation. An additional 299.4 acres of habitat within Tule Springs (state lands) that occur outside the alternative boundary would also be conserved. The acreages provided in Table 4.4-3 will be used to describe impacts for resources resulting from selection of Alternative B.

Table 4.4-3. Acres of Habitat Conserved under Alternative B

Resource	Alternative Boundary Habitat (acres)	Assumed Disturbance Areas Affecting Vegetation Communities (acres)	Acres Conserved*†
General Vegetation			
Creosote Bush–White Bursage‡	6,929.1	239.8	6,689.3
White Bursage–Shadscale Saltbush	1,034.0	5.3	1,028.7
White Bursage–Creosote Bush Upper Alluvial Fan‡	905.9	19.9	886.0
Creosote Bush	657.1	11.5	645.6
Cattle Saltbush–White Bursage‡	508.1	8.5	499.6
Badlands	225.2	8.0	217.2
Human-Modified Lands	101.2	26.8	74.3
White Bursage–Spiny Menodora	118.8	1.3	117.5
White Bursage–Virgin River Brittlebush‡	13.2	0.0	13.2
Total General Vegetation	**10,495.6**	**321.1**	**10,174.4**
Special-Status Plants			
Las Vegas Buckwheat–Occupied Habitat	125.2	0.2	125.0
Las Vegas Buckwheat–High-Potential Habitat	722.2	3.9	718.3
Las Vegas Buckwheat–Moderate-Potential Habitat	199.0	1.6	197.4
Total Las Vegas Buckwheat Habitat	**1,046.4**	**5.7**	**1,040.7**
Bearpoppy–Occupied Habitat	504.3	3.4	500.9
Bearpoppy–High-Potential Habitat	816.6	5.2	811.4
Bearpoppy–Moderate-Potential Habitat	1,174.0	27.7	1,146.3
Total Bearpoppy Habitat	**2,494.9**	**36.3**	**2,458.6**

* Acres conserved = (Acres available within alternative boundary) – (Acres affected by alternative actions).

† Conservation does not include the 299.4 acres of Tule Springs that would also be conserved.

‡ Vegetation community that includes cacti/yucca low- or high-density habitat.

Direct and Indirect Impacts

VEGETATION COMMUNITIES

Direct, adverse impacts to vegetation communities would result from selection of Alternative B. The total amount of direct impacts from actions under this alternative would total only 2.9% of general vegetation communities within the Alternative B CTA boundary, which would be a negligible direct impact to general vegetation communities.

Indirect, adverse impacts would be similar to those described for Alternative A. Construction activities would cause fugitive dust, which would lead to an adverse impact because it lowers primary plant production by reducing photosynthesis (21%–58%), reducing leaf transpiration, reducing leaf area, lowering water use efficiency, and/or increasing leaf temperatures in Mojave Desert shrubs (Sarifi et al. 1997). Whereas impacts under this alternative would be short term, they would also be widespread and substantial. Therefore, for this alternative, fugitive dust from construction activities is expected to have moderate short-term impacts.

Alternative B is anticipated to have substantial direct, long-term, beneficial impacts for general vegetation communities. These benefits would be similar to those described for general vegetation under Alternative A, i.e., surface disturbance rehabilitation, conservation of habitat, and access to habitat for education and scientific research purposes, which could provide information to facilitate future conservation efforts. This alternative would conserve 10,174.4 acres of general vegetation communities.

In conclusion, as shown in Table 4.4-3 and discussed above, impacts to general vegetation communities resulting from selection of this alternative would not reach a level of significance. Removal of vegetation would be limited to a small amount of the vegetation within the CTA study area, whereas conservation of vegetation would have a substantial beneficial impact to general vegetation communities. Selection of Alternative B is anticipated to provide the second-highest amount of direct, long-term, beneficial impacts for the general vegetation communities out of the six alternatives because it protects the second-highest amount of natural habitat (10,495.6 acres out of the 13,622.7-acre CTA study area = 77.0%) from direct and indirect impacts.

CACTUS AND YUCCA

Alternative B would result in direct, long-term impacts to cactus and yucca from the permanent removal of up to 395.3 acres (3.7%) of high-density and 17.0 acres (3.2%) of low-density habitat from the actions associated with this alternative. The total amount of direct impact from actions under this alternative would be only 3% of the total available cactus and yucca habitat in Alternative B CTA boundary, which would be a negligible direct impact to cactus and yucca.

Indirect, adverse impacts from increased access, visitation, and fugitive dust would be similar to those described for general vegetation; these activities are expected to be minimal, and construction activities would be short term. Therefore, these impacts would be negligible.

Alternative B is anticipated to have direct, long-term, beneficial impacts to cactus and yucca. The benefits would be the same as those described for cactus and yucca under Alternative A, including surface disturbance rehabilitation, conservation of habitat, and access to habitat for education and scientific research purposes, which could indirectly facilitate future conservation efforts. This alternative would conserve 8,603.1 acres of high- and low-density cactus and yucca habitat.

In conclusion, adverse impacts to cactus and yucca resulting from selection of this alternative would not reach a level of significance. As shown in Table 4.4-3 and discussed above, removal of cactus and yucca habitat would be negligible, as this is limited to a very small amount of the total cactus and yucca habitat within the CTA boundary. Conservation of vegetation would have a substantial beneficial impact to cactus and yucca. Furthermore, cactus and yucca species are protected under NRS 527.060–527.120 and are therefore required for salvage at the discretion of BLM, which would further reduce the number of cactus and yucca individuals impacted.

SPECIAL-STATUS PLANT SPECIES

Federally Listed and Candidate Plant Species

Las Vegas Buckwheat

Direct, adverse impacts to Las Vegas buckwheat would result from the anticipated removal of 0.2 acre of occupied, 3.9 acres of high-potential, and 1.6 acres of moderate-potential habitat associated with construction activities. All buckwheat habitat would be within the CTA boundary, and there would be no buckwheat habitat in lands available for disposal. The loss of high-potential, low-potential, and occupied buckwheat habitat would occur, which would lead to a significant impact to buckwheat without implementation of specific mitigation measures. Impacts to moderate-potential habitat would be under the

10% threshold and would not reach a level of significance. Additionally, removal of habitat would result in fragmentation and increased edge effects for populations. Development actions are assumed to be extremely limited for this alternative; therefore, habitat removal would be minimal.

Indirect, adverse impacts would be similar to those described for general vegetation. These activities are expected to be minimal, and adverse impacts would be negligible.

Alternative B would have direct, long-term, beneficial impacts for Las Vegas buckwheat. These benefits would be the same as those described for Alternative A. Overall, this alternative conserves 1,040.7 acres of occupied, high-potential, and moderate-potential habitat, resulting in long-term, beneficial impacts to Las Vegas buckwheat by increasing the amount of land conserved and minimizing fragmentation of habitat.

In conclusion, as shown in Table 4.4-3 and discussed above, a loss of occupied, high-potential, and moderate-potential buckwheat habitat would occur, which would lead to a significant impact to buckwheat without implementation of specific mitigation measures. Approximately 0.2% of occupied, 0.5% of high-potential, and 0.8% of moderate-potential habitat would be lost, and impacts to the latter habitat type would not reach a level of significance. All impacts to buckwheat habitat would occur within the CTA boundary. Implementation of mitigation measures identified in Appendix A would lead to no net unmitigated loss of occupied, high-potential, and moderate-potential habitat and no loss of known individual plants. Therefore, significant adverse impacts would not occur following mitigation, whereas beneficial impacts are anticipated to be substantial.

BLM Special-Status and State of Nevada Protected Plant Species

Las Vegas Bearpoppy and Merriam's Bearpoppy

There would be up to 5.4 acres of occupied, 266.6 acres of high-potential, and 0.1 acre of moderate-potential habitat in lands available for disposal. The loss of occupied, high-potential, and moderate-potential bearpoppy habitat would lead to a significant impact to bearpoppy without implementation of specific mitigation measures. Impacts to habitat would be under the 10% threshold and would not reach a level of significance. Additionally, removal of habitat would result in fragmentation and increased edge effects for populations. Development actions are assumed to be extremely limited for this alternative; therefore, habitat removal would be minimal.

Indirect, adverse impacts would be similar to those described for general vegetation. These activities are expected to be minimal and short term, and adverse impacts would be negligible.

Alternative B would have substantial long-term, beneficial impacts for bearpoppy. These benefits would be the same as those described for Alternative A. Additionally, the conservation of 2,458.6 acres of occupied, high-potential, and moderate-potential habitat would be substantial, resulting in long-term beneficial impacts to bearpoppy by increasing the amount of land conserved and minimizing fragmentation of habitat.

In conclusion, as shown in Table 4.4-3 and discussed above, a loss of occupied, moderate-potential, and high-potential bearpoppy habitat would occur, which would lead to a significant impact to bearpoppy without implementation of specific mitigation measures. Less than 0.7% of occupied, 0.7% of high-potential, and 2.5% of moderate-potential bearpoppy habitat would be impacted, although impacts to the latter habitat type would not reach a level of significance. All impacts to bearpoppy within the alternative boundary would be mitigated by measures identified in Appendix A. However, a loss of 3.7 acres of high-potential habitat would occur from development on lands outside the alternative boundary, which would lead to significant adverse impacts to bearpoppy because mitigation measures described in this document would not apply outside the alternative boundary once the land has been transferred.

Mitigation Measures and Unavoidable Adverse Impacts

There would be a significant impact to bearpoppy from the loss of 3.7 acres of high-potential habitat resulting from land disposal outside the CTA boundary. NDF has the authority to issue conditional take permits for the disturbance or destruction of Nevada critically endangered plant species. Therefore, NDF may issue a permit for take of Las Vegas bearpoppy, which would include mitigation to reduce the effects of development on bearpoppy; however, there would still be an unavoidable direct loss of habitat, which is considered a significant impact to the species. No additional unavoidable adverse impacts would occur to vegetation, cactus/yucca, or sensitive plants from the completion of this alternative.

4.4.6 Alternative C

Alternative C would encompass a total of 6,362.3 acres (see Figure 2.4-3). The 7,260.4 acres that are within the CTA study area but outside the Alternative C boundary are assumed to be developed. A total of 573 acres of vegetation would be impacted (Table 4.4-4) from actions assumed under this alternative, resulting in 5,789.3 acres of total conservation within the alternative. An additional 299.4 acres of habitat within Tule Springs (state lands) that occur outside the alternative boundary would also be conserved. Impacts to vegetation resources are summarized in Table 4.4-4.

Table 4.4-4. Acres of Habitat Conserved under Alternative C

Resource	Alternative Boundary Habitat (acres)	Assumed Disturbance Areas Affecting Vegetation Communities (acres)	Acres Conserved*†
General Vegetation			
Creosote Bush–White Bursage‡	3,337.8	247.7	3,090.1
White Bursage–Shadscale Saltbush	1,037.6	61.0	976.6
White Bursage–Creosote Bush Upper Alluvial Fan‡	394.9	78.3	316.6
Creosote Bush	657.1	58.1	599.0
Cattle Saltbush–White Bursage‡	504.3	59.4	444.9
Badlands	218.7	25.6	193.1
Human-Modified Lands	80.0	34.0	46.0
White Bursage–Spiny Menodora	118.8	6.5	112.3
White Bursage–Virgin River Brittlebush‡	13.2	2.4	10.7
Total General Vegetation	**6,362.3**	**573.0**	**5,789.3**
Special-Status Plants			
Las Vegas Buckwheat–Occupied Habitat	125.2	3.8	121.4
Las Vegas Buckwheat–High-Potential Habitat	725.9	49.6	676.3
Las Vegas Buckwheat–Moderate-Potential Habitat	199.0	8.9	190.1
Total Las Vegas Buckwheat Habitat	**1,050.1**	**62.3**	**987.8**
Bearpoppy–Occupied Habitat	504.5	32.4	472.1
Bearpoppy–High-Potential Habitat	818.3	34.8	783.5
Bearpoppy–Moderate-Potential Habitat	1,152.0	93.6	1,058.4
Total Bearpoppy Habitat	**2,474.8**	**160.8**	**2,314.0**

* Acres conserved = (Acres available within alternative boundary) – (Acres affected by alternative actions).

† Conservation does not include the 299.4 acres of Tule Springs that would also be conserved.

‡ Vegetation community that includes cacti/yucca low- or high-density habitat.

Direct and Indirect Impacts

VEGETATION COMMUNITIES

Direct, long-term, adverse impacts to vegetation communities would result from Alternative C, with the permanent removal of 573.1 acres of vegetation. The total amount of direct impact from actions under this alternative would be 9% of the total available habitat within the alternative boundary, which would be a moderate direct impact to general vegetation communities.

Indirect, adverse impacts would be similar to those described for Alternative A. However, these impacts would occur at a higher level as a result of private development on 6,960.9 acres that are within the CTA study area but outside the alternative boundary. Construction activities would cause fugitive dust, which would lead to an adverse impact because it lowers primary plant production by reducing photosynthesis (21%–58%), reducing leaf transpiration, reducing leaf area, lowering water use efficiency, and/or increasing leaf temperatures in Mojave Desert shrubs (Sarifi et al. 1997). Development actions under this alternative would be short term but would also be widespread and substantial. Therefore, for this alternative, fugitive dust from construction activities is expected to have moderate short-term impacts.

Alternative C is also anticipated to have moderate direct, long-term, beneficial impacts to general vegetation communities. Beneficial impacts would result from rehabilitating existing surface disturbance sites by BLM, conserving vegetation, and providing access to habitat for education and scientific research purposes. Additionally, conservation of 5,789.3 acres of vegetation would result under this alternative.

In conclusion, as shown in Table 4.4-4 and discussed above, direct and indirect adverse impacts to general vegetation communities resulting from selection of this alternative would not reach a level of significance. Effects of habitat fragmentation are anticipated to be moderate, as future development would result in the removal of 573.1 acres (9%) of the Alternative C CTA boundary. Selection of Alternative C would provide the third-highest amount of direct, long-term, beneficial impacts to the general vegetation communities out of the six alternatives because it protects the third-highest amount of natural habitat (5,789.3 acres out of the 13,622.7-acre CTA study area = 42.5%) from direct and indirect impacts.

CACTUS AND YUCCA

Direct, adverse impacts to cactus and yucca species would result from selection of Alternative C. This alternative would result in direct, adverse impacts to cactus and yucca from the anticipated removal of up to 328.5 acres (3.1%) of high-density and 59.4 acres (11.8%) of low-density cactus and yucca habitat within the CTA study area. Construction activities would result in the total removal of 9.1% of the total available cactus and yucca habitat in Alternative C boundary, which would be a moderate direct impact.

Indirect, adverse impacts would be similar to those described for general vegetation. These activities are expected to be both moderate and short term.

Alternative C would have moderate direct, long-term, beneficial impacts for cactus and yucca. These benefits include rehabilitating existing surface disturbance sites by BLM, conserving cactus and yucca habitat, and providing access to habitat for education and scientific research purposes. Additionally, the conservation of 3,862.3 acres of high- and low-density cactus and yucca habitat would occur under this alternative.

As discussed above, adverse impacts to cactus and yucca are expected to be moderate. Effects of habitat removal and fragmentation would be moderate, as future development would result in the removal of 387.9 acres of high- and low-density cactus and yucca habitat, which is 9.1% of total cactus and yucca habitat available within Alternative C CTA boundary. Additionally, because most of these developments

are linear in nature and are spread throughout the alternative boundary, the effects of habitat fragmentation would be accentuated further. Cactus and yucca species are protected under NRS 527.060–527.120 and are therefore required for salvage at the discretion of BLM, which would further reduce the number of cactus and yucca individuals impacted.

SPECIAL-STATUS PLANT SPECIES

Federally Listed and Candidate Plant Species

Las Vegas Buckwheat

Direct, adverse impacts to Las Vegas buckwheat would result from the anticipated removal of 3.8 acres of occupied, 49.6 acres of high-potential, and 8.9 acres of moderate-potential habitat from the actions associated with this alternative. There would be up to 142.1 acres of moderate-potential habitat in lands available for disposal. The loss of occupied, high-potential, and moderate-potential buckwheat habitat would occur. However, impacts to Las Vegas buckwheat habitat would be under the 10% threshold and therefore would not reach a level of significance. Indirect, adverse impacts would be similar to those described for general vegetation.

This alternative would have moderate long-term, beneficial impacts to this species. These benefits include rehabilitating existing surface disturbance sites by the BLM, conserving 5,789.3 acres of general vegetation communities, protecting sensitive plant habitat, and providing access to habitat for education and scientific research purposes. Additionally, conservation of 987.8 acres of occupied, high-potential, and moderate-potential habitat would reduce habitat fragmentation for Las Vegas buckwheat.

In conclusion, as shown in Table 4.4-4 and discussed above, a loss of both high-potential and occupied buckwheat habitat would occur. Less than 4.5% of moderate-potential buckwheat habitat would be impacted, and impacts to that habitat type would not reach a level of significance. All impacts to buckwheat habitat within the alternative boundary would be mitigated by measures identified in Appendix A. The loss of 2.0 acres of moderate-potential habitat would occur from development of lands outside the alternative boundary but would not reach a level of significance because it would represent less than 1% of all habitat. Therefore, adverse impacts would not reach a level of significance, whereas beneficial impacts are anticipated to be substantial.

BLM Special-Status and State of Nevada Protected Plant Species

Las Vegas Bearpoppy and Merriam's Bearpoppy

Direct, adverse impacts to bearpoppy would occur from the anticipated removal of 32.4 acres of occupied, 34.8 acres of high-potential, and 93.6 acres of moderate-potential habitat with the actions assumed under this alternative. There would be up to 7.1 acres of high-potential and 779.7 acres of moderate-potential habitat in lands available for disposal. Additionally, removal of habitat would result in moderate fragmentation and increased edge effects for populations. The loss of occupied, high-potential, and moderate-potential bearpoppy habitat would occur. Habitat removal and fragmentation from actions assumed under this alternative would be a moderate impact to bearpoppy. Indirect, adverse impacts would be similar to those described for general vegetation.

Alternative C would have moderate long-term, beneficial impacts for bearpoppy. These benefits include rehabilitating existing surface disturbance sites by BLM, conserving general vegetation communities, protecting sensitive plant habitat, and providing access to habitat for education and scientific research purposes. Additionally, the conservation of 2,314.0 acres of occupied, high-potential, and moderate-potential habitat would reduce habitat fragmentation for bearpoppy.

As shown in Table 4.4-4 and discussed above, the loss of both high-potential and occupied bearpoppy habitat would occur, which would lead to a significant impact to bearpoppy without implementation of specific mitigation measures. There would be no net unmitigated loss of habitat and no loss of known individual plants. The loss of 160.8 acres (6.5%) of potential habitat would not reach a level of significance because it is less than 10% of total potential habitat. The loss of 7.1 acres of high-potential habitat would occur from development on lands that are outside the alternative boundary, which would lead to significant adverse impacts to bearpoppy because mitigation measures described in this document would not apply to areas outside the alternative boundary once the land has been transferred (areas transferred from BLM would fall under Clark County's master permit for allowable take).

Mitigation Measures and Unavoidable Adverse Impacts

There would be a significant impact to bearpoppy by the loss of 7.1 acres of high-potential habitat as a result of land disposal outside the CTA boundary. NDF has the authority to issue conditional take permits for the disturbance or destruction of Nevada critically endangered plant species. Therefore, NDF may issue a permit for take of Las Vegas bearpoppy, which would include mitigation to reduce the effects of development on bearpoppy; however, there would still be an unavoidable direct loss of habitat, which is considered a significant impact to the species. No additional unavoidable adverse impacts would occur to vegetation, cactus/yucca, or sensitive plants from the completion of this alternative.

4.4.7 Alternative D

Alternative D would encompass 5,301.3 acres (see Figure 2.4-4). An additional 298.6 acres of habitat that occur outside the alternative boundary and that are within the Eglington Preserve would be conserved, as well. The 8,022.7 acres that are within the CTA study area but outside Alternative D boundary would ultimately be developed. A total of 632.8 acres of vegetation would be impacted from the actions assumed under this alternative and would result in the conservation of a total of 4,668.5 acres within the alternative. Impacts to vegetation resources are summarized in Table 4.4-5.

Direct and Indirect Impacts

VEGETATION COMMUNITIES

Long-term impacts to vegetation communities would result from the permanent removal of 632.8 acres (11.9%) of vegetation in the Alternative D CTA boundary. The total amount of direct impact from actions under this alternative would be 11.9% of the total available habitat in the alternative boundary, which would be a moderate direct impact to general vegetation communities.

Under this alternative, the same types of indirect, adverse impacts would occur as under Alternative B. These impacts would occur at a higher level because the alternative boundary includes less land for conservation.

Alternative D is anticipated to have moderate direct, long-term, beneficial impacts to general vegetation communities. These benefits include rehabilitating existing surface disturbance sites by BLM, conserving vegetation, and providing access to habitat for education and scientific research purposes. Additionally, 4,668.5 acres of vegetation communities would be conserved.

In conclusion, as shown in Table 4.4-5 and discussed above, direct and indirect adverse impacts to general vegetation communities resulting from selection of this alternative would not reach a level of significance. Effects of habitat fragmentation are anticipated to be moderate, as development actions associated with this alternative would occur on lands within and adjacent to the alternative boundary.

Table 4.4-5. Acres of Habitat Conserved under Alternative D

Resource	Alternative Boundary Habitat (acres)	Assumed Disturbance Areas Affecting Vegetation Communities (acres)	Acres Conserved*†
General Vegetation			
Creosote Bush–White Bursage‡	2,555.2	238.1	2,317.1
White Bursage–Shadscale Saltbush	1,040.6	67.7	972.9
White Bursage–Creosote Bush Upper Alluvial Fan‡	180.1	59.7	120.4
Creosote Bush	559.9	57.0	502.9
Cattle Saltbush–White Bursage‡	524.7	59.4	465.3
Badlands	227.9	77.9	150.0
Human-Modified Lands	99.5	64.8	34.8
White Bursage–Spiny Menodora	101.9	5.8	96.1
White Bursage–Virgin River Brittlebush‡	11.5	2.5	9.0
Total General Habitat	**5,301.4**	**632.9**	**4,668.5**
Special-Status Plants			
Las Vegas Buckwheat–Occupied Habitat	120.8	3.7	117.1
Las Vegas Buckwheat–High-Potential Habitat	632.7	40.5	592.2
Las Vegas Buckwheat–Moderate-Potential Habitat	201.7	8.2	193.5
Total Las Vegas Buckwheat Habitat	**955.2**	**52.4**	**902.8**
Bearpoppy–Occupied Habitat	499.2	31.8	467.4
Bearpoppy–High-Potential Habitat	762.9	25.7	737.2
Bearpoppy–Moderate-Potential Habitat	489.7	33.2	456.5
Total Bearpoppy Habitat	**1,751.8**	**90.7**	**1,661.1**

* Acres conserved = (Acres available within alternative boundary) – (Acres affected by alternative actions).

† Conservation does not include the 298.6-acre Eglington Preserve, which would also be conserved.

‡ Vegetation community that includes cacti/yucca low- or high-density habitat.

Compared with the other alternatives, Alternative D has a moderate amount of direct, long-term, beneficial impacts for the general vegetation communities because it protects the fourth-lowest amount of natural habitat (4,668.5 acres out of the 13,622.7-acre CTA study area = 34.3%) from direct and indirect adverse impacts.

CACTUS AND YUCCA

Adverse impacts to cactus and yucca species would result from selection of Alternative D. This alternative would result in adverse impacts to cactus and yucca from the anticipated removal of up to 300.3 acres (10.9%) of high-density and 59.4 acres (11.3%) of low-density cactus and yucca habitat. Construction activities would result in the removal of 11% of the total available cactus and yucca habitat in the Alternative D CTA boundary, which would be a moderate direct impact. Indirect, adverse impacts would be similar to those described for general vegetation.

Alternative D would have moderate direct, long-term, beneficial impacts for cactus and yucca. These benefits include rehabilitating existing surface disturbance sites by BLM, conserving cactus and yucca habitat, and providing access to habitat for education and scientific research purposes. Additionally, the conservation of 2,911.8 acres of high- and low-density cactus and yucca habitat is anticipated through the selection of this alternative.

In conclusion, as shown in Table 4.4-5 and discussed above, adverse impacts to cactus and yucca would be moderate. Cactus and yucca species are protected under NRS 527.060–527.120 and are therefore required for salvage at the discretion of BLM, which would further reduce the number of cactus and yucca individuals impacted.

SPECIAL-STATUS PLANT SPECIES

Federally Listed and Candidate Plant Species

Las Vegas Buckwheat

Direct, adverse impacts to Las Vegas buckwheat would result from the anticipated removal of 3.7 acres of occupied, 40.5 acres of high-potential, and 8.2 acres of moderate-potential habitat and from the actions associated with this alternative. Unlike for Alternatives A and B, there would be up 1.3 acres of potential habitat in lands available for disposal. The loss of occupied, high-potential, and moderate-potential buckwheat habitat would occur. However, impacts to Las Vegas buckwheat habitat would be under the 10% threshold and therefore would not reach a level of significance. Fragmentation from actions under this alternative would be a moderate impact to buckwheat.

Indirect, adverse impacts would be similar to those described for general vegetation. These activities are expected to be both moderate and short term.

This alternative would have moderate long-term, beneficial impacts for this species. These benefits include rehabilitating existing surface disturbance sites by BLM, conserving general vegetation communities, protecting sensitive plant habitat, and providing access to habitat for education and scientific research purposes. Additionally, the conservation of 902.8 acres of occupied and potential habitat would reduce habitat fragmentation for Las Vegas buckwheat.

In conclusion, as shown in Table 4.4-5 and discussed above, a loss of both occupied and high-potential buckwheat habitat would occur, which would lead to a significant impact to buckwheat without implementation of specific mitigation measures. Less than 4.1% of moderate-potential habitat would be impacted, and impacts would not reach a level of significance. All impacts within Alternative D boundary would be mitigated by measures identified in Appendix A. The loss of 1.3 acres of moderate-potential habitat would occur from development of lands that are within the CTA study area but outside the alternative boundary. The loss of 1.3 acres represents less than 1% of all habitat and would therefore not reach a level of significance. Therefore, adverse impacts would not reach a level of significance.

BLM Special-Status and State of Nevada Protected Plant Species

Las Vegas Bearpoppy and Merriam's Bearpoppy

Direct, adverse impacts to bearpoppy would occur from the anticipated removal of 31.8 acres of occupied, 25.7 acres of high-potential, and 33.2 acres of moderate-potential habitat with the actions assumed with this alternative. There would be up to 282.7 acres of moderate-potential and 3.2 acres of high-potential habitat in lands available for disposal. The habitat removal and resulting fragmentation would be moderate. Loss of occupied, high-potential, and moderate-potential bearpoppy habitat would occur. However, impacts to bearpoppy habitat would be under the 10% threshold and therefore would not reach a level of significance. Habitat removal and fragmentation from actions under this alternative would be a significant impact to bearpoppy.

Indirect, adverse impacts would be similar to those described under general vegetation. These impacts are expected to be both moderate and short term.

Alternative D is anticipated to have some minimal long-term, beneficial impacts to bearpoppy. These benefits include rehabilitating existing surface disturbance sites by BLM, conserving general vegetation communities, protecting sensitive plant habitat, and providing access to habitat for education and scientific research purposes. Additionally, the conservation of 1,661.1 acres of occupied, high-potential, and moderate-potential habitat would reduce habitat fragmentation for bearpoppy.

As shown in Table 4.4-5 and discussed above, the loss of both high-potential and occupied bearpoppy habitat would occur, which would lead to a significant impact to bearpoppy without implementation of specific mitigation measures. Less than 10% of moderate-potential habitat would be impacted, and impacts to moderate-potential habitat would not reach a level of significance. All impacts to occupied and high-potential bearpoppy habitat within the Alternative D boundary would be mitigated by measures identified in Appendix A. However, the loss of 3.2 acres of high-potential habitat would occur from development of land that is within the CTA study area but outside the alternative boundary, which would lead to significant adverse impacts because mitigation measures described in this document would not apply to areas outside the alternative boundary once the land has been transferred.

Mitigation Measures and Unavoidable Adverse Impacts

There would be a significant impact to bearpoppy from the loss of 3.2 acres of high-potential habitat as a result of land disposal outside the CTA boundary. NDF has the authority to issue conditional take permits for the disturbance or destruction of Nevada critically endangered plant species. Therefore, NDF may issue a permit for take of Las Vegas bearpoppy, which would include mitigations to reduce the effects of development on bearpoppy; however, there would still be an unavoidable direct loss of habitat, which is considered a significant impact to the species. No additional unavoidable adverse impacts would occur to vegetation, cactus/yucca, or sensitive plants from selection of this alternative.

4.4.8 Alternative E

Alternative E would encompass a total of 3,313.8 acres (see Figure 2.4-5). The 298.6 acres designated as Eglington Preserve would not be included in the Alternative E CTA boundary; however, Eglington Preserve would not be available for disposal. The 10,010.3 acres that are within the CTA study area but outside Alternative E boundary would ultimately be developed. A total of 335 acres of vegetation would be impacted from the implementation of actions assumed under this alternative and would result in the conservation of a total of 2,978.8 acres within the alternative. Impacts to vegetation resources resulting from Alternative E are summarized in Table 4.4-6.

Direct and Indirect Impacts

VEGETATION COMMUNITIES

Long-term impacts to vegetation communities would result from the permanent removal of 335.0 acres of vegetation. The total amount of direct impacts from this alternative would be 10.1% of the total available habitat in the alternative boundary, which would be a moderate direct impact to general vegetation communities.

Under this alternative, the same types of indirect, adverse impacts are anticipated as for Alternative B, but these impacts would occur at a higher level. Construction activities would cause fugitive dust, which would lead to an adverse impact because it lowers primary plant production by reducing photosynthesis (21%–58%), reducing leaf transpiration, reducing leaf area, lowering water use efficiency, and/or increasing leaf temperatures in Mojave Desert shrubs (Sarifi et al. 1997). Whereas developments under

this alternative would be short term, they would also be widespread and substantial. Therefore, for this alternative, fugitive dust from construction activities is expected to have moderate short-term impacts.

Table 4.4-6. Acres of Habitat Conserved under Alternative E

Resource	Alternative Boundary Habitat (acres)	Assumed Disturbance Areas Affecting Vegetation Communities (acres)	Acres Conserved*†
General Vegetation			
Creosote Bush–White Bursage‡	1,414.7	113.1	1,301.6
White Bursage–Shadscale Saltbush	975.9	51.7	924.2
White Bursage–Creosote Bush Upper Alluvial Fan‡	61.1	23.5	37.6
Creosote Bush	222.5	3.5	219.0
Cattle Saltbush–White Bursage‡	345.8	24.4	321.4
Badlands	131.4	60.4	71.0
Human-Modified Lands	64.3	53.8	10.5
White Bursage–Spiny Menodora	92.8	3.4	89.4
White Bursage–Virgin River Brittlebush‡	5.3	1.2	4.1
Total General Vegetation	**3,313.8**	**335.0**	**2,978.8**
Special-Status Plants			
Las Vegas Buckwheat–Occupied Habitat	120.7	3.7	117.0
Las Vegas Buckwheat–High-Potential Habitat	628.5	39.2	589.3
Las Vegas Buckwheat–Moderate-Potential Habitat	200.5	7.1	193.4
Total Las Vegas Buckwheat Habitat	**949.7**	**50.0**	**899.7**
Bearpoppy–Occupied Habitat	496.3	29.0	467.3
Bearpoppy–High-Potential Habitat	756.7	23.3	733.4
Bearpoppy–Moderate-Potential Habitat	490.3	25.8	464.5
Total Bearpoppy Habitat	**1,743.3**	**78.1**	**1,665.2**

* Acres conserved = (Acres available within alternative boundary) – (Acres affected by alternative actions).

† Conservation does not include the 298.6-acre Eglington Preserve, which would also be conserved.

‡ Vegetation community that includes cacti/yucca low- or high-density habitat.

Alternative E is anticipated to have marginal direct, long-term, beneficial impacts to general vegetation communities. Selection of Alternative E would result in the conservation of 2,978.8 acres of vegetation communities.

In conclusion, as shown in Table 4.4-6 and discussed above, direct and indirect adverse impacts to general vegetation communities resulting from selection of this alternative would not reach a level of significance. Effects of habitat fragmentation are anticipated to be moderate, as development actions associated with this alternative would occur adjacent to and within the alternative boundary. Selection of Alternative E would provide the fifth-lowest amount of conservation for general vegetation communities out of the six alternatives because it protects the fifth-lowest amount of natural habitat (2,978.8 acres out of the 13,622.7-acre CTA study area = 22%) from direct and indirect impacts.

CACTUS AND YUCCA

Alternative E would result in long-term impacts to cactus and yucca from the permanent removal of up to 137.8 acres (9.3%) of high-density and 24.4 acres (7.0%) of low-density habitat for the actions associated with this alternative. These actions combined would result in the removal of 8.9% of the total available cactus and yucca habitat in the alternative boundary, which would be a moderate direct impact to cactus and yucca.

Indirect, adverse impacts would be similar to those described for general vegetation.

Alternative E is anticipated to have marginal long-term, beneficial impacts for cactus and yucca. These benefits are similar to those described for Alternative D. Alternative E would result in the conservation of 1,664.7 acres of high- and low-density cactus and yucca habitat.

As shown in Table 4.4-6 and discussed above, adverse impacts to cactus and yucca are expected to be moderate. Cactus and yucca species are protected under NRS 527.060–527.120 and are therefore required for salvage at the discretion of BLM, which would further reduce the number of cactus and yucca individuals impacted.

SPECIAL-STATUS PLANT SPECIES

Federally Listed and Candidate Plant Species

Las Vegas Buckwheat

Direct, adverse impacts to Las Vegas buckwheat would result from the anticipated removal of 3.7 acres of occupied, 39.2 acres of high-potential, and 7.1 acres of moderate-potential habitat from the actions associated with this alternative. There would be up 32.7 acres of moderate-potential and 3.1 acres of high-potential habitat in lands available for disposal. Loss of occupied, high-potential, and moderate-potential buckwheat habitat would occur. However, impacts to Las Vegas buckwheat habitat would be under the 10% threshold and therefore would not reach a level of significance. Fragmentation from actions under this alternative would be a moderate impact to buckwheat.

Indirect, adverse impacts would be similar to those described for general vegetation. These impacts are expected to be moderate.

This alternative would have marginal long-term, beneficial impacts for this species, similar to those described for Alternative D; however, for this alternative, less land would be conserved. Additionally, the conservation of 899.7 acres of occupied, high-potential, and moderate-potential habitat would reduce habitat fragmentation for Las Vegas buckwheat.

In conclusion, as shown in Table 4.4-6 and discussed above, the loss of both high-potential and occupied buckwheat habitat would occur, which would lead to a significant impact to buckwheat without implementation of specific mitigation measures. Less than 4% of moderate-potential habitat would be impacted, and impacts would not reach a level of significance. All impacts from Alternative E boundary would be mitigated by implementation of measures identified in Appendix A. The loss of 32.7 acres of moderate-potential habitat would occur from development of lands that are within the CTA study area but outside the alternative boundary; this represents less than 3% of all habitat and would not reach a level of significance. However, the loss of 3.1 acres of high-potential habitat would occur from development of land outside the CTA boundary, which would lead to significant adverse impacts to buckwheat because mitigation measures described in this document would not apply to areas outside the alternative boundary once the land has been transferred.

BLM Special-Status and State of Nevada Protected Plant Species

Las Vegas Bearpoppy and Merriam's Bearpoppy

Direct, adverse impacts to bearpoppy would occur from the anticipated removal of 29.0 acres of occupied, 23.3 acres of high-potential, and 25.8 acres of moderate-potential habitat with the actions associated with this alternative. There would be up 684.9 acres of moderate-potential and 39.8 acres of high-potential habitat in lands available for disposal. Additionally, actions assumed for analysis would result in moderate fragmentation and increased edge effects for populations. The habitat removal and resulting fragmentation would be moderate. The loss of both high- and moderate-potential, as well as occupied, bearpoppy habitat would occur. However, impacts to bearpoppy habitat would be under the 10% threshold and therefore would not reach a level of significance. Habitat removal and fragmentation from actions under this alternative would be a moderate impact to bearpoppy.

Indirect, adverse impacts would be similar to those described for general vegetation.

Alternative E is anticipated to have marginal long-term, beneficial impacts for bearpoppy. These benefits include rehabilitating existing surface disturbance sites by BLM, conserving general vegetation communities, protecting sensitive plant habitat, and providing access to habitat for education and scientific research purposes. Additionally, conservation of 1,665.1 acres of occupied and high-potential habitat would reduce habitat fragmentation for bearpoppy.

As shown in Table 4.4-6 and discussed above, loss of both high-potential and occupied bearpoppy habitat would occur, which would lead to a significant impact to bearpoppy without implementation of specific mitigation measures. Less than 6% of moderate-potential habitat would be impacted, and impacts to moderate-potential habitat would not reach a level of significance. All impacts from actions proposed in this alternative would be mitigated; there would be no net unmitigated loss of habitat and no loss of known individual plants. All impacts to bearpoppy would be within the CTA boundary. However, the loss of 684.9 acres of moderate-potential habitat would occur from development of land that is within the CTA study area but outside the Alternative E boundary, which represents 25% of all habitat and would lead to significant impacts. Additionally, the loss of 3.2 acres of high-potential habitat would occur from development of land outside the alternative boundary, which would lead to significant adverse impacts to bearpoppy because mitigation measures described in this document would not apply to areas outside the alternative boundary once the land has been transferred.

Mitigation Measures and Unavoidable Adverse Impacts

There would be a significant impact to bearpoppy as a result of the loss of 3.2 acres of high-potential habitat from land disposal outside the CTA boundary. NDF has the authority to issue conditional take permits for the disturbance or destruction of Nevada critically endangered plant species. Therefore, NDF may issue a permit for take of Las Vegas bearpoppy, which would include mitigations to reduce the effects of development on bearpoppy; however, there would still be an unavoidable direct loss of habitat, which is considered a significant impact to the species. No additional unavoidable adverse impacts would occur to vegetation, cactus/yucca, or sensitive plants from selection of this alternative.

4.4.9 No-Action Alternative

Under the No-Action Alternative, the CTA boundary would encompass 1,448.2 acres and would include the BLM portion of Eglington Preserve and Tule Springs (see Figure 2.4-6). The 12,174.5 acres that are within the CTA study area but outside the No-Action Alternative boundary would ultimately be

developed as necessary on a case-by-case basis. Impacts to vegetation resources resulting from the No-Action Alternative are summarized in Table 4.4-7.

Table 4.4-7. Acres of Habitat Conserved under the No-Action Alternative

Resource	Alternative Boundary Habitat (acres)	Actions Affecting Vegetation Communities (acres)	Acres Conserved*†
General Vegetation			
Creosote Bush–White Bursage‡	535.3	0.0	535.3
White Bursage–Shadscale Saltbush	743.4	4.4	739.0
White Bursage–Creosote Bush Upper Alluvial Fan‡	0.0	0.0	0.0
Creosote Bush	0.0	0.0	0.0
Cattle Saltbush–White Bursage‡	61.8	0.0	61.8
Badlands	9.4	0.0	9.4
Human-Modified Lands	16.5	5.9	10.6
White Bursage–Spiny Menodora	81.8	0.7	81.1
White Bursage–Virgin River Brittlebush‡	0.0	0.0	0.0
Total General Vegetation	**1,448.2**	**11.0**	**1,437.2**
Special-Status Plants			
Las Vegas Buckwheat–Occupied Habitat	57.7	0.7	57.0
Las Vegas Buckwheat–High-Potential Habitat	381.5	3.6	377.9
Las Vegas Buckwheat–Moderate-Potential Habitat	297.2	3.1	294.1
Total Las Vegas Buckwheat Habitat	**736.4**	**7.4**	**729.0**
Bearpoppy–Occupied Habitat	213.9	1.4	212.6
Bearpoppy–High-Potential Habitat	703.7	6.1	697.6
Bearpoppy–Moderate-Potential Habitat	0.1	0.0	0.0
Total Bearpoppy Habitat	**917.7**	**7.5**	**910.2**

* Acres conserved = (Acres available within CTA boundary) – (Acres affected by alternative actions).

† Conservation occurs within the previously designated Tule Springs and Eglington Preserve.

‡ Vegetation community that includes cacti/yucca low- or high-density habitat.

Direct and Indirect Impacts

VEGETATION COMMUNITIES

Long-term, adverse impacts to vegetation communities are anticipated through the selection of the No-Action Alternative. The potential land disposals under this alternative would allow for permanent removal of up to 12,174.5 acres of vegetation.

Indirect impacts to vegetation communities would include habitat fragmentation resulting from development surrounding the CTA boundary. Removal of habitat would result in fragmentation and increased edge effects for populations.

As shown in Table 4.4-7 and discussed above, direct and indirect adverse impacts are expected to be moderate from this alternative because these vegetation communities are relatively common throughout the LVV. Selection of the No-Action Alternative is anticipated to provide the least amount of direct, long-

term, beneficial impacts to the general vegetation communities of the six alternatives because it protects the least amount of natural habitat (1,437.2 acres out of the 13,622.7-acre CTA study area = 10.6%) from direct and indirect impacts.

CACTUS AND YUCCA

Long-term impacts to cactus and yucca are anticipated through the selection of the No-Action Alternative. Under the No-Action Alternative, development of up to 12,174.5 acres of land would ultimately occur; 91.5% of this land is cactus and yucca habitat. This would be a moderate direct impact to cactus and yucca.

Indirect impacts to cactus and yucca habitat would include habitat fragmentation resulting from development surrounding the CTA. Removal of habitat would result in fragmentation and increased edge effects for populations.

As shown in Table 4.4-7 and discussed above, direct and indirect adverse impacts are expected to be moderate from this alternative because these cactus and yucca communities are relatively common throughout the LVV.

SPECIAL-STATUS PLANT SPECIES

Federally Listed Plant Species

Las Vegas Buckwheat

Direct, adverse impacts to Las Vegas buckwheat would result from the permanent removal of 0.7 acre of occupied, 3.6 acres of high-potential, and 3.1 acres of moderate-potential habitat within the CTA boundary under this alternative. Land disposal and subsequent development would result in the removal of approximately 220 acres of moderate-potential and 65 acres of occupied habitat outside Eglington Preserve and Tule Springs.

Indirect, adverse impacts to Las Vegas buckwheat would include habitat fragmentation resulting from development surrounding the population within the CTA boundary. Removal of habitat would result in fragmentation and increased edge effects for populations.

As shown in Table 4.4-7 and discussed above, direct and indirect adverse impacts to Las Vegas buckwheat are expected to be significant under the No-Action Alternative. This alternative does not meet the purpose of and need for the project, which includes protection of the natural resources in the area.

BLM Special-Status and State of Nevada Protected Plant Species

Las Vegas Bearpoppy and Merriam's Bearpoppy

Direct impacts to Las Vegas bearpoppy would result from permanent removal of 1.4 acres of occupied and 6.1 acres of high-potential habitat within the CTA boundary under this alternative. Land disposal and subsequent development would result in the removal of approximately 1,250 acres of moderate-potential and 285 acres of occupied habitat outside Eglington Preserve and Tule Springs.

Indirect impacts to bearpoppy would include habitat fragmentation resulting from development surrounding the population within the CTA. Removal of habitat would result in fragmentation and increased edge effects for populations.

As shown in Table 4.4-7 and discussed above, direct and indirect adverse impacts to bearpoppy are expected to be significant under the No-Action Alternative; it does not meet the purpose for action, which includes protecting the natural resources in the area.

Mitigation Measures and Unavoidable Adverse Impacts

There would be a significant impact to buckwheat populations from the loss of 220 acres of moderate-potential and 65 acres of occupied habitat. Significant impacts to bearpoppy include 1,250 acres of moderate-potential and 285 acres of occupied habitat loss as a result of land disposal outside the CTA boundary. NDF has the authority to issue conditional take permits for the disturbance or destruction of Nevada critically endangered plant species. Therefore, NDF may issue a permit for take of Las Vegas bearpoppy, which would include mitigations to reduce the effects of development on bearpoppy; however, there would still be an unavoidable direct loss of habitat, which is considered a significant impact to the species. No additional unavoidable adverse impacts would occur to vegetation, cactus/yucca, or sensitive plants from the completion of this alternative.

4.5 CULTURAL RESOURCES AND TRADITIONAL CULTURAL PROPERTIES

4.5.1 Cultural Resources

As described in Chapter 3, identification of cultural resources within the CTA study area was conducted in 2003 and 2004 by HRA as part of the overall cultural resources study of the entire disposal area, as initially defined (Ahlstrom et al. 2004). Three historic properties and one TCP are within the study area: 26Ck247, 26Ck6507, and 26Ck6910.

Because of the intense residential and commercial development in the area surrounding two of these sites, BLM determined that mitigation of impacts to two of these sites (26Ck6507 and 26Ck6910) would be completed, regardless of whether any proposed action analyzed in this SEIS would directly affect them. Table 4.5-1 provides the impacts to cultural resources from each alternative. The following BLM management goals and objectives apply to cultural resources.

Analysis Approach and Assumptions

Impacts to cultural resources are analyzed by determining whether any NRHP-eligible site will be affected directly or indirectly by any of the actions included in each alternative.

Assumptions for analysis include

- BLM completed the process of mitigating current impacts to Sites 26Ck6507 and 26Ck6910.
- Implementation of the mitigation measures prescribed in the HPTP for Sites 26Ck6507 and 26Ck6910 has recovered the sites' NRHP values.
- Tule Springs (26Ck247) is already protected by the BLM and state of Nevada. Ownership and use of the site will not change as a result of this SEIS.

Based on these assumptions, no documented NRHP-eligible or NRHP-listed cultural resource will be directly affected by any of the alternatives analyzed in this SEIS. As previously stated, the Tule Springs site (26Ck247) is already listed as a National Register Site, and no development would be allowed to take place within its boundaries.

Table 4.5-1. Comparison of Cultural Resource Impacts, by Alternative

Resource	A (acres/other factor)	B (Preferred) (acres/other factor)	C (acres/other factor)	D (acres)	E (acres)	No Action (acres)
Alternative Boundary	12,952.5	10,495.6	6,362.3	5,301.4	3,313.8	1,448.2
Site 26Ck247 (Tule Springs)*	Low probability of indirect impacts from people brought to the site area as the result of residential and commercial development.	Low probability of indirect impacts from people brought to the site area as the result of residential and commercial development.	Slightly higher probability of indirect impacts from people brought to the site area as the result of residential and commercial development.	Higher probability of indirect impacts from people brought to the site area as the result of residential and commercial development.	Higher probability of indirect impacts from people brought to the site area as the result of residential and commercial development.	Higher probability of indirect impacts from people brought to the site area as the result of residential and commercial development.
Undocumented Historic Properties	Indirect impacts from people attracted to the area as the result of increased trail development and educational programs.	Indirect impacts from people attracted to the area as the result of increased trail development and educational programs.	Slightly higher probability of indirect impacts from people brought to the site area as the result of additional trail development and new residential and commercial development.	Higher probability of indirect impacts from people brought to the site area as the result of residential and commercial development.	Higher probability of indirect impacts from people brought to the area as the result of residential and commercial development.	Higher probability of indirect impacts from people brought to the area as the result of residential and commercial development surrounding Eglington Preserve and Tule Springs.

* Tule Springs will not change ownership or use as a result of this SEIS.

Given these assumptions, the analysis will focus on indirect impacts to Tule Springs and on direct and indirect impacts to undocumented historic properties both within and along the edge of the CTA alternative boundaries.

Impact Thresholds

The criteria used to assess adverse impacts to cultural resources are set forth in 36 CFR 800.5. An adverse impact includes any impacts that may alter directly or indirectly one or more of the characteristics of a historic property that qualify that property for eligibility for the NRHP. Characteristics that must be considered include the property's setting, feeling, location, design, materials, workmanship, and association. For all properties, direct impacts include any physical destruction or damage to all or part of the property. Direct impacts may also result from construction activities in areas adjacent to the resource. Any activity that causes physical destruction or damage to a significant cultural resource is defined as a direct impact to the resource.

Some of the more substantial indirect impacts result from increased human activity in the vicinity of a cultural resource; this heightens the threat of physical impacts to the resource. New developments can bring humans into proximity to significant cultural resources. Increasing the frequency of visits to the area surrounding a cultural resource augments the risk of vandalism, looting, or unintentional destruction of the resource. Some indirect impacts do not affect the physical integrity of the resource but rather affect the setting of the resource. The setting of a resource can be impacted by visual intrusions such as modern transmission lines, residential or commercial developments within a viewshed, or atmospheric intrusions such as smog. The setting can also be affected by substantial changes to the audible environment; such changes can result from increased vehicle or air traffic, heavy machinery operating in the vicinity of a site, or elimination of the natural sounds that would have created the historical audible environment.

Actions Proposed under all Alternatives that Would Cause Change to Existing Cultural Resources

The following action would be implemented under all alternatives and would cause change to existing cultural resources:

- BLM has developed and will implement a treatment plan for eligible cultural sites within the CTA in compliance with the NHPA, except for Tule Springs.

DIRECT AND INDIRECT IMPACTS

BLM has developed a treatment plan for eligible cultural sites within the CTA study area (Sites 26Ck6507 and 26Ck6910). This plan is currently under review by SHPO, and BLM expects to complete implementation of the plan before the end of 2008. Implementation of the treatment plan is expected to recover the characteristics of the sites that made them eligible for the NRHP. Since this mitigation will be completed prior to issuance of this SEIS, this is the only action that will affect these two sites.

None of the previously authorized ROWs or allowable new alignments would pass through or be adjacent to Tule Springs; therefore, they would have no impact to Tule Springs.

New development would be subject to site-specific NEPA analyses. Generally, the introduction of more people to an area of a significant site puts the site at risk. The CTA study area, including Tule Springs, has already been impacted by actions consisting of unauthorized collecting, digging, and trash dumping. During the most recent professional survey of Tule Springs in 2002, historic cans were present that have since been removed. Other factors contributing to the lack of surface material would be the result of extensive surface collection conducted by Susia in the 1960s and possibly action by natural forces, including erosion.

Construction activities would also result in indirect, adverse impacts to undocumented historic properties throughout the CTA study area and along the edge of the CTA boundaries. New development would attract increased public visitation to the area, which could result in a greater loss of undocumented resources as a result of trampling, unauthorized collection, and vandalism. Under each of the alternatives, public education of local residents and law enforcement presence would result in beneficial impacts to cultural resources. Additionally, the Conservation Agreement would provide ongoing protection for the site itself as well as areas adjacent to Tule Springs. This would be beneficial for the overall preservation of the site.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts to cultural resources include loss of undocumented cultural resources from development activities outside the alternative boundaries. No unavoidable adverse impacts would occur to cultural resources as a result of any of the actions common to all alternatives.

Alternative A

DIRECT AND INDIRECT IMPACTS

Independent of study efforts associated with this SEIS, BLM is mitigating impacts to two NRHP-eligible sites within the CTA study area following prescriptions in the HPTP (Cannon et al. 2008); mitigation has been completed. The mitigation measures are described below in "Mitigation Measures and Unavoidable Adverse Impacts." Therefore, under Alternative A, impacts to the NRHP-eligible sites will be mitigated before the alternative can be implemented. BLM and the State of Nevada will retain ownership of Tule

Springs. There is no intent to mitigate the site or dispose of the land on which Tule Springs is located, and the site is currently under BLM protection.

New development facilities will improve public access and attract increased visitation to the CTA, including Tule Springs. Additional access and visitation could result in an increased loss of undocumented cultural resources in the CTA from unauthorized collection, trampling of surface resources, and vandalism of sites. By controlling visitor access, some cultural resources could be better protected. Through the implementation of well-designed educational programs, visitors could learn to become stewards of cultural resources and assist in their future protection.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

Independent of study efforts associated with this SEIS, mitigation measures for all sites are complete. Mitigation measures include the development of public interpretive and educational materials. Additionally, mitigation efforts at each site will follow a research design tailored to the specific characteristics that make each site eligible for the NRHP. The specific mitigation tasks implemented for each NRHP-eligible site located in the CTA study area are briefly summarized below. More detail on research questions and mitigation measures is provided in the HPTP (Cannon et al. 2008).

Site 26Ck6507, the Tonopah Wagon Road, has been determined eligible for the NRHP under Criterion A. Mitigation measures for this site included historical survey, archival research, detailed recording of linear features and associated artifact concentrations, and site mapping. Detailed maps and drawings were produced that identified site features, artifact concentrations, and topographic features. No surface artifacts were collected.

Site 26Ck6910 is a prehistoric hearth and artifact scatter that has been determined eligible for the NRHP under Criterion D. Mitigation measures for this site included surface collection, excavation, and laboratory analysis. Excavation included three contiguous, 1 × 1–m units placed to expose a profile of the hearth feature and develop a better understanding of the feature. Artifact analysis used methods set forth in the HPTP (Cannon et al. 2008).

For Tule Springs, new development should be planned to encourage resting or stopping in areas away from any sensitive parts of the site.

Alternative B (BLM Preferred Alternative)

DIRECT AND INDIRECT IMPACTS

New development will likely bring more people into the area of Tule Springs and throughout the CTA boundary. The increase in public visitation would lead to greater opportunities for adverse impacts to Tule Springs and to any undocumented cultural resources from vandalism, illegal OHV use, trampling, and illegal collection. By controlling visitor access, some cultural resources could be better protected. Through the implementation of well-designed educational programs, visitors could learn to become stewards of cultural resources and assist in their future protection. All new development should be planned to encourage resting or stopping in areas away from any sensitive parts of Tule Springs.

Additionally, up to 2,827.5 acres located outside the boundary of this alternative would be available for disposal and development. This increase in private development along the perimeter of the alternative boundary would result in increased opportunities for adverse impacts to undocumented cultural resources both in lands available for private development as well as from increased public proximity to the CTA. The proximity of new development to the CTA would result in increased accessibility to cultural resources present in the CTA.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

Mitigation measures for Alternative B are identical to those under Alternative A.

Alternative C

DIRECT AND INDIRECT IMPACTS

New development would consist of a loss of undocumented resources resulting from construction activities associated with that development. Additionally, new development under this alternative would result in a loss of resource quality from increased public visitation, trampling, digging, dumping, and vandalism. The increase in public visitation would lead to greater opportunities for adverse impacts to Tule Springs and to any undocumented cultural resources from vandalism, illegal OHV use, trampling, and illegal collection. All new development should be planned to encourage resting or stopping in areas away from any sensitive parts of Tule Springs or any new sites identified during site-specific analysis.

Additionally, up to 7,260.4 acres located outside the boundary of this alternative would be available for disposal and development. This increase in private development along greater portions of the perimeter of the alternative boundary would result in increased opportunities for adverse impacts to undocumented cultural resources both in lands available for private development as well as from increased public proximity to the CTA.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

Mitigation measures for Alternative C are identical to those for Alternative A.

Alternative D

DIRECT AND INDIRECT IMPACTS

Up to 8,321.3 acres outside this alternative boundary would be available for disposal and development. This increase in private development along the majority of the perimeter of the alternative boundary would result in greater opportunities for adverse impacts to undocumented cultural resources from construction activities for private development as well as from greater public proximity to the CTA. Indirect impacts from having private development surround the alternative boundary range from trampling of surface artifacts to illegal excavation and collection.

New development would result in a loss of undocumented resources from construction activities associated with that development.

New development within the CTA would result in an increase in public visitation, which would lead to greater risks for adverse impacts to Tule Springs and to any undocumented cultural resources from vandalism, illegal OHV use, trampling, and illegal collection. All new development should be planned to encourage resting or stopping in areas away from any sensitive parts of Tule Springs or any new sites identified during site-specific analysis.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

Mitigation measures for Alternative D are identical to those under Alternative A. Unavoidable adverse impacts to cultural resources include loss of undocumented cultural resources from development activities outside the alternative boundary.

Alternative E

DIRECT AND INDIRECT IMPACTS

Up to 10,010.3 acres outside this alternative boundary would be available for disposal and development. This increase in private development along the perimeter of the alternative boundary would result in opportunities for adverse impacts to undocumented cultural resources in lands available for private development from surface-disturbing construction activities; these would be indirect, adverse impacts from the increased proximity of private development to the CTA alternative boundary. Additionally, new development within the CTA alternative boundary would result in the loss of undocumented cultural resources from construction activities associated with those developments. An increase in public visitation resulting from new development within the CTA boundaries and increased adjacent development would lead to greater opportunities for adverse impacts to Tule Springs and to any undocumented cultural resources from vandalism, illegal OHV use, trampling, and illegal collection. However, all new development should be planned to encourage resting or stopping in areas away from any sensitive parts of Tule Springs or any new sites identified during site-specific analysis.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

Mitigation measures for Alternative E are identical to those under Alternative A. Unavoidable adverse impacts to cultural resources include the loss of undocumented cultural resources from development activities outside the alternative boundary.

No-Action Alternative

DIRECT AND INDIRECT IMPACTS

Up to 12,150.0 acres outside this alternative boundary would be available for disposal and development. This is the greatest amount of acreage available for private development of any of the alternatives. This increase in private development along the perimeter of the alternative boundary would result in the greatest opportunity for adverse impacts to both undocumented cultural resources in lands available for private development and to existing known resources within Tule Springs. The piecemeal development of commercial and residential property in the vicinity of Tule Springs would attract more people into the area of the site.

An increase in public visitation resulting from new development would lead to greater opportunities for adverse impacts to Tule Springs and to any undocumented cultural resources from vandalism, illegal OHV use, trampling, and illegal collection.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

Mitigation measures for the No-Action Alternative are identical to those under Alternative A. Unavoidable adverse impacts to cultural resources include loss of undocumented cultural resources from development activities outside the alternative boundary.

4.5.2 Traditional Cultural Properties

As noted in Section 3.5.1, "Introduction," tribal consultation regarding TCPs and related religious concerns has been conducted directly with the Las Vegas Paiute Tribe and will remain open to ensure adequate participation by interested Indian tribes. Las Vegas Paiute Tribal representatives shared their views with BLM and SWCA regarding the cultural significance of the LVW, and the Las Vegas Paiute

Tribe has established that the LVW in and of itself represents an important cultural landscape and potential TCP to the Las Vegas Paiute Tribe, as well as to the Chemehuevi and Moapa Paiute tribes. The LVW and surrounding area are within the aboriginal homelands of these tribes. It was revealed through consultation that, according to Paiute belief, the entirety of the landscape has religious as well as cultural importance to the Paiute people. This belief is consistent with and supported by the previous identification of other regional landscapes/areas of cultural significance, such as the Ivanpah Valley, Gypsum Cave, and Middle Kyle Canyon. The Las Vegas Paiute Tribe has noted that they do not want to identify individual locations of specific sites of cultural importance; this is intended to protect such sites from any intentional disturbance that may occur if the location becomes known to the general public. Thus, it is the position of the Tribe that the entire landscape should be considered as a whole in the assessment of any projected impacts and in the consideration of project alternatives.

Through direct tribal consultation, it is known and established that the Las Vegas Paiute Tribe considers the CTA and its surroundings to represent a cultural landscape of great significance to the Southern Paiute people. In general, the concept of a cultural landscape encompasses a variety of issues and resources, including ethnographic issues, TCPs, and tribal religious and spiritual access/use concerns, as the landscape is considered to be inextricably linked to the history, culture, and spirituality of the Paiute people. This concept is supported by numerous ethnographic studies and publications, and many ethno-historical accounts attest to the cultural and religious significance of regional landscape, landforms, and natural features, as well as archaeological sites (e.g., Euler and Fowler 1966, 1973; Fowler 1989, 1992; Fowler and Fowler 1971; Stoffle and Arnold 2003; Stoffle and Zedeño 2001; Stoffle et al. 2002; Stoffle et al. 2004). Of particular relevance to the ethnographic concerns of the CTA is the recent study *Puha Flows from It: The Cultural Landscape Study of the Spring Mountains* (Stoffle et al. 2004). This study of Southern Paiute cultural landscapes provides a basis for evaluating alternatives and developing treatment plans. For example, the authors note,

> Landscapes are recognized as needing different types of management based on what they contain. So a mountain range may have hot springs, above-timberline vistas, obsidian outcrops, caves, and patches of medicine plants. Each has its own value and together they make up the cultural landscape for a traditional people. Each feature of this landscape can have different management responses based on the needs of the federal agency and the culture of the appropriate people. (Stoffle et al. 2004:179)

In past consultations, representatives of the Las Vegas Paiute Tribe have described places such as the landscapes in the area of the LVW as venues that offer their tribal members opportunities for experiencing spiritual peace, maintaining a connection with their past, and preserving their future. This view generally contrasts with present-day Western cultural views of places such as the LVW as sites for urbanization and recreation.

Table 4.5-2 provides a comparison of impacts to cultural resources and TCPs from each alternative.

Table 4.5-2. Comparison of Cultural Resource and Traditional Cultural Property Impacts, by Alternative

Resource	A (acres/other factor)	B (Preferred) (acres/other factor)	C (acres/other factor)	D (acres/other factor)	E (acres/other factor)	No Action (acres/other factor)
Alternative Boundary	12,952.5	10,495.6	6,362.3	5,301.4	3,313.8	1,448.2
Las Vegas Wash Traditional Cultural Property	Provides greatest protection of traditional use areas.	Provides adequate protection of traditional use area. Development would alter the cultural landscape.	Development would alter the cultural landscape.	Development would alter the cultural landscape.	Development would alter the cultural landscape.	Potential for significant adverse impacts over time.

Analysis Approach and Assumptions

The threshold for significant impacts to a TCP was developed through discussions in spring 2008 with the consulting tribal representatives. Because TCPs by their nature include information sensitive to tribes, concerned tribes are regarded as the sole authorities for establishing when an impact to a TCP is significant.

Impact Thresholds

Addressing adverse impacts to traditional cultural resources is complex. Although guidelines for evaluating such impacts are set forth in 36 CFR 800.5, considerations must also include protections, access, and use of such resources as described in the American Indian Religious Freedom Act of 1978 [42 USC 1996], which protects and preserves the inherent right of Native Americans to believe, express, and exercise their traditional religions, including their unhindered access to religious sites; the Native American Graves Protection and Repatriation Act of 1990 [25 USC 3001], which establishes the right of Indian tribes to claim ownership of certain cultural items, including human remains and funerary, sacred, and cultural patrimonial objects and artifacts; the Executive Order on Indian Sacred Sites [EO 13007], which directs federal agencies to accommodate access to, and ceremonial use of, Indian sacred sites and to avoid adversely affecting the physical integrity of such sacred sites; and other regulations that may mandate adequate coordination with Indian tribes regarding resources of importance to them.

In terms of the NHPA, a TCP may be subject to an adverse impact when an action may alter directly or indirectly one or more of the characteristics that may qualify that property for NRHP eligibility. In other instances, such as for EO 13007, evaluations of adverse impacts need to assess how such resources and places relate to the continuation of a tribe's culture and society and how an action may affect contemporary and future use and access. In general, direct impacts include any physical destruction, damage, or alterations to all or part of a property. Direct impacts may also result from construction activities in areas adjacent to the resource. For most TCP considerations within the LVW, an impact occurs when an agent (direct or indirect) could cause physical destruction or damage to a resource that is significant to the cultural landscape.

Discussions held on May 6, 2008, with the Las Vegas Paiute Tribe provided information to guide the assessment of impacts to TCPs in the project area. In general, the Tribe would prefer that no development take place in or around the LVW. They expressed concerns about direct and indirect impacts that may result from the development of roads across, or near, the LVW and the Paiute Reservation boundary.

Actions Proposed under all Alternatives that Would Cause Change to the Las Vegas Wash as a Traditional Cultural Property

The following actions assumed for analysis would cause change to the existing LVW and, as a result, could affect the cultural landscape of the LVW as a TCP. The changes described below include both beneficial and adverse impacts.

Possible beneficial impacts:

- Conservation measures would be put in place for the protection of surface paleontological sites and sensitive plant habitats.
- BLM would inventory unauthorized surface disturbances in the CTA, including illegal dump sites, user-created trails and tracks, and other trespasses, and would seek to rehabilitate these disturbances to a more natural condition to improve management and protection of sensitive resources.

DIRECT AND INDIRECT IMPACTS

Some of the common actions would have a beneficial impact to the LVW and may restore or improve some of the characteristics that define it as a TCP/cultural landscape. Conservation of sensitive plant habitat may protect and preserve species of special tribal interest. Rehabilitation of disturbed areas could help to restore the peaceful serenity of the LVW, which is tribally valued.

Creation of new development throughout the LVW area could result in an increase in human use of the area and therefore could lead to adverse impacts to unidentified traditional cultural resources.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

In order to mitigate damage to the resources of concern to the people of the Las Vegas Paiute Tribe, the consulting tribe could be involved as cooperators in the planning of any new developments to help find and plan the best possible routes, determine places to avoid or monitor for non-sanctioned use, and suggest other means of protecting resources of tribal importance. Continued involvement of the consulting tribe in planning such developments to minimize future impacts is the best mitigation measure to address impacts common to all alternatives and will provide the best process by which to achieve BLM Management Goal 4. Through ongoing consultation with the tribal government of the Las Vegas Paiute Tribe and its designated representatives—such as the Tribal Historic Preservation Offices and Conservation Office—impacts could be tracked and analyzed and specific changes or measures implemented to mitigate adverse impacts as the project proceeds.

Alternative A

This alternative is not anticipated to result in impacts of concern to the consulting tribe. Discussions with the Las Vegas Paiute Tribe have determined that this alternative is the most acceptable alternative for meeting the goals of the tribe for the preservation of TCPs and cultural use of the landscape.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

Because this alternative creates a buffer around the reservation lands of the Las Vegas Paiute Tribe, at least one of the tribal conservation goals would be met under this alternative. Under this alternative, tribal representatives could be involved in the planning of new development to find the best possible routes, determine places to avoid or monitor for non-sanctioned use, and suggest other means to protect resources of traditional cultural association. Continued involvement of the Las Vegas Paiute Tribe in planning such developments and minimizing future impacts is the best mitigation measure under this alternative. Through ongoing consultation with the government of the Las Vegas Paiute Tribe and the cooperation of designated tribal representatives (e.g., Tribal Historic Preservation Offices and Conservation Office, elders, or others), impacts can be tracked and analyzed, and specific changes or measures can be implemented to mitigate adverse impacts.

Alternative B (BLM Preferred Alternative)

This alternative is not anticipated to result in impacts of tribal concern based on the results of consultation. Discussions with the Las Vegas Paiute have determined that this alternative is the second-best alternative in terms of its acceptability for meeting the goals of the tribe for the preservation of TCPs and cultural use of the landscape. Alternative B, although similar to Alternative A, protects 2,456.9 fewer acres than Alternative A.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

Because this alternative emphasizes the protection of sensitive resources, at least one tribal conservation goal would be met for the LVW. Under this alternative, the Las Vegas Paiute Tribe could be involved as a cooperator in the planning of new development in order to find the best possible routes, determine places to avoid or monitor for non-sanctioned use, and suggest other means to protect resources of traditional cultural association. Continued involvement of the tribe in planning such developments and minimizing future impacts is the best mitigation measure under this alternative. Through ongoing consultation with the government of the Las Vegas Paiute Tribe and the cooperation of its designated representatives (e.g., Tribal Historic Preservation Offices and Conservation Office, elders, and others), impacts can be tracked and analyzed, and specific changes or measures can be implemented to mitigate adverse impacts.

Alternative C

This alternative was determined through tribal consultation as having the potential to affect resources of cultural and traditional importance and to adversely affect the Las Vegas Paiute Tribe's needs and goals for their own future development. Discussions with the Las Vegas Paiute Tribe have determined that this alternative is unacceptable to the tribe in terms of satisfying goals of the tribe for the preservation of TCPs and cultural uses of the landscape. The Las Vegas Paiute Tribe maintains that this alternative would increase recreational use to a level that could prove unmanageable, would result in new development that could affect the sanctity of the area and directly and indirectly affect traditional use areas, and has the potential to lead to even more development in the upland bajada. Such development could result in more ROW permit applications across BLM land, which could lead to cumulative future impacts to the LVW and the reservation lands of the Las Vegas Paiute Tribe. Implementation of Alternative C would result in significant adverse impacts to TCPs and the traditional cultural landscape.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

The Las Vegas Paiute Tribe has determined that this alternative would change the cultural landscape to such a degree that the mitigation of TCPs and the surrounding cultural landscape appears impossible from the perspective of the tribe. This could change if the tribe is involved in planned development and consulted on an ongoing basis or is involved as a cooperating entity for present and future plans. Such an agreement would need to be negotiated with the government of the Las Vegas Paiute Tribe.

Alternative D

This alternative would have similar impact potential as Alternative C, although Alternative D would cover approximately 1,060.9 fewer acres than Alternative C. Tribal consultation determined that Alternative D has the potential to affect resources of cultural and traditional importance and to affect the Las Vegas Paiute Tribe's needs and goals for future development. Discussions with the Las Vegas Paiute Tribe have determined that this alternative would not satisfy tribal goals for preservation of TCPs and continued cultural use of the landscape. The Las Vegas Paiute Tribe maintains that this alternative would increase use to a level that could prove unmanageable, would result in new roads that could adversely affect the sanctity of the area and directly and indirectly affect traditional use areas, and has the potential to lead to even more development in the upland bajada. Implementation of Alternative D would result in significant adverse impacts to TCPs and the traditional cultural landscape.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

Mitigation measures for this alternative are the same as those under Alternative C.

Alternative E

Because this alternative would remove lands from federal oversight, it has the greatest potential to affect resources of cultural and traditional importance, as well as the Las Vegas Paiute Tribe's needs and goals for future development. With the removal of CTA lands from federal oversight, the Las Vegas Paiute Tribe would be unable to participate in developing alternatives and mitigation measures for resources on removed lands, and cumulative impacts would result that would adversely affect tribal resources from direct use of those lands or indirectly on surrounding lands from use of removed lands.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

No mitigation measures have been identified regarding this alternative. The removal of official means for tribal involvement in development planning precludes the forms of mitigation suggested for other alternatives. Implementation of Alternative E would result in significant adverse impacts to TCPs and the traditional cultural landscape.

No-Action Alternative

This alternative assumes that development would continue according to present trends. In general, this alternative would have future impacts that would require tribal involvement on an ongoing, government-to-government basis but does not seek to programmatically minimize impacts to resources. Therefore, there would be the potential for significant adverse impacts over time. Tribal involvement in future development would occur on a case-by-case basis. Case-by-case involvement would not be effective in mitigating impacts to TCPs and the cultural landscape. This alternative is thus contrary to the preservation and use goals of the Las Vegas Paiute Tribe and its people.

MITIGATION MEASURES AND UNAVOIDABLE ADVERSE IMPACTS

Although this alternative would mean "business as usual" in terms of land use and management of resources, it could also result in significant damage and loss of resources of interest to the tribe, and tribal consultation has concluded that it is even less acceptable to the Las Vegas Paiute Tribe than the other alternatives with potentially significant adverse effects that might not be mitigated, such as Alternative E. Mitigation and avoidance of adverse impacts would need to take place on a case-by-case basis; therefore, the potential for loss of resources would be difficult to mitigate programmatically, which is possible under some of the other alternatives.

4.6 PALEONTOLOGICAL RESOURCES

Four hundred thirty-six paleontological localities have been recorded within the CTA study area. The fossils of the LVF, together with the relatively complete stratigraphic record exposed within the CTA study area, represent a critically important scientific and educational resource for understanding the late Pleistocene biota of the Mojave Desert and may represent a lagerstatte, as well as patterns of extinction and climate change. Lagerstatten are areas of preservation or varied diversity. These localities can represent a cross section of the local regional environment.

FLPMA mandates the treatment of paleontological resources that have scientific value [FLPMA 102(8)]. For the purposes of this analysis and in accordance with BLM policy, scientifically significant paleontological resources are defined as vertebrate fossils that are identifiable to taxon and/or element, noteworthy occurrences of invertebrate and plant fossils, and vertebrate trackways.

For this analysis, paleontological resources within the study area are classified in one of two categories: 1) those that have already eroded onto the ground surface and are thus visible (surface fossils); and 2) those that are still buried within rock strata and are thus not visible (subsurface fossils). Surface fossils may be located during a field survey, evaluated, and salvaged by paleontologists prior to a surface-disturbing action. Impacts to occurrences of previously documented surface fossils at individual fossil localities under each alternative represent the only paleontological resources that are quantifiable for this analysis. Because they are not visible, subsurface fossils cannot be located and evaluated prior to ground disturbance. Rather, the likelihood of adverse effects on subsurface fossils can only be estimated by determining the number and types of fossils that have been previously discovered within the CTA study area and elsewhere within the same fossil-bearing geological units (formations, members, submembers, and individual strata). The existence of subsurface fossils can only be ascertained by monitoring excavations during a surface-disturbing action. Thus, it is not possible to precisely quantify impacts to subsurface fossils prior to their discovery because their locations are unknown.

It is important to point out that subsequent to the location and removal of significant surface fossils during a paleontological field survey and issuance of a surface clearance recommendation, additional subsurface fossils will continue to erode onto the ground surface over time. This effect is particularly prevalent in areas that are prone to high rates of erosion, such as the active wash.

The potential for adverse impacts to both surface and subsurface paleontological resources is directly proportional to the amount of ground disturbance associated with a proposed action. Thus, the higher the amount of surface disturbance associated with development within the CTA, the greater the potential for adverse impacts to paleontological resources within the LVF. Table 4.6-1 provides the impacts to paleontological resources from each alternative.

4.6.1 Analysis Approach and Assumptions

This analysis is based on paleontological data for the CTA maintained by BLM. The data set was generated by the SBCM as part of the Paleontology Plan (SBCM 2004), which was prepared as part of the LVVDB FEIS (BLM 2004a). The data set includes, among other things, the geographic locations and stratigraphic provenance of fossil localities within the CTA and the types of fossils present at each locality. The data were analyzed in order to assess and quantify the impacts to paleontological resources under each alternative. As stated above, only surface fossils that have already been inventoried are available for this analysis. In addition, there are an unknown number of fossils buried within strata of the LVF within the ULVW that could be adversely impacted by surface disturbance in CTA lands that are made available for disposal.

Table 4.6-1. Comparison of Paleontological Resource Impacts, by Alternative

Resource	A	B (Preferred)	C	D	E	No Action
CTA Alternative Boundary (acres)	12,952.5	10,495.6	6,362.3	5,301.4	3,313.8	1,448.2
Lands Available for Disposal (acres)	370.8	2,827.5	6,961.0	8,022.7	10,010.3	12,174.5
Fossil Localities within CTA (number)	436	436	434	422	318	82
Fossil Localities outside CTA (number)	0	0	2	14	118	354
Major Fossil Localities within CTA (number)*	181	181	180	175	139	33
Major Fossil Localities outside CTA (number)*	0	0	1	6	42	148

* See 4.6.1 for definition of major fossil localities.

The approach taken in this analysis is to determine 1) the acreage of LVF that would be preserved or made available for disposal under each alternative in order to estimate potential impacts to buried fossils that are still contained within sediments of the LVF and whose specific locations are unknown; 2) the total number of known fossil localities on lands that would be preserved or made available for disposal under each alternative; and 3) the number of known "major fossil localities," as defined below, on lands that would be preserved or made available for disposal under each alternative.

Assumptions for the analysis include the following:

- The distribution of the LVF has not been geologically mapped in detail within the CTA study area, and it is known to underlie thin deposits of late Quaternary alluvium within the ULVW. Therefore, for the purpose of this analysis, it is assumed that surface disturbance anywhere within the CTA study area has the potential to disturb the LVF and its fossil assemblage, and the stratigraphic provenance of individual fossil localities (units defined by Haynes 1967) was not factored into this analysis.
- The majority of localities consist of isolated or only partially articulated skeletal elements representing individual animals, as opposed to larger accumulations with multiple individuals and more articulated skeletons. The localities are therefore assumed to be small in terms of geographic extent (size). This is consistent with the descriptions of fossils listed in the paleontological data set on which the analysis is based. The locality-size assumption for the purpose of this analysis is that the sizes of the fossil localities analyzed within the CTA study area are relatively small and roughly similar. Locality size was not used as a variable in determining impacts to paleontological resources.
- "Major Fossil Surface Localities" are defined by the taxon types and quality of preservation of fossils at each locality. For the purpose of this analysis, and in accordance with BLM policy, major fossil surface localities are defined as those that contain vertebrate fossils that are identifiable to taxon and/or skeletal element and are thus scientifically significant. In terms of vertebrate fossils, with the exception of tortoise and bird, only mammalian fossils are listed in the data set. Those vertebrate fossils that are identified to below the taxonomic level of class (to order, family, or genus) and/or are identified to element type (tooth, tusk, vertebra, eggshell, etc.) constitute major fossil surface localities in this analysis. Major fossil surface localities as defined by taxon types are those that are listed in the data set as preserving the remains of tortoise, bird, rodent, lagomorph, bison, camel, unidentified artiodactyl, horse, and mammoth. It is important to recognize that in situ fossils as listed in the data set may be only partially exposed by erosion, and although the exposed portion may only be described as "mammal bone fragments" in the data set, the unweathered buried portion of the fossil may in fact be identifiable to both taxon and element once the fossil has been fully excavated and prepared in the laboratory.
- The preferred mitigation approach is to protect the paleontological resources of the LVF by configuring the boundaries of the CTA to include major fossil surface localities, establish in situ preservation areas that are kept undisturbed and unfragmented, and mitigate those paleontological localities than cannot be preserved in situ. Although actions to preserve paleontological localities in situ may result in a loss of scientific value, the assumption in this analysis is that wherever possible, the in situ preservation of paleontological resources is preferable over salvage and removal of fossils from the CTA.

4.6.2 Impact Thresholds

The threshold for significant adverse impacts to paleontological resources is reached with the damage or destruction of scientifically significant fossils and the consequent loss of associated scientific information. This includes destruction as the result of surface and subsurface disturbance as well as unlawful

vandalism and unauthorized collection of scientifically significant fossil remains. Accomplishing the BLM objectives of configuring the CTA boundary to include all major fossil localities, establishing in situ preservation areas for paleontological areas that are kept undisturbed and unfragmented, maintaining in situ key paleontological localities, and providing mitigation for paleontological localities that cannot be preserved in situ would ensure that potential adverse impacts to paleontological resources within the CTA study area would be reduced to below the level of significance.

Direct and Indirect Impacts

The following are definitions of types of impacts and related effects on paleontological resources, followed by an analysis of impacts anticipated under each alternative. Direct impacts are expected under all alternatives to varying degrees and correlate directly with the amount (acreage and depth) of surface disturbance of the LVF within the CTA study area.

Direct, adverse impacts to surface or subsurface paleontological resources are the result of destruction by breakage and crushing by surface disturbing actions, including construction-related excavations. Direct impacts also occur as a result of the breakage, removal and burial of fossils by stream bank erosion, and erosion downstream. In areas that contain paleontologically sensitive geological units, hydrologically or construction-related surface disturbance has the potential to adversely impact surface fossils and an unknown quantity of subsurface fossils. Without mitigation, these fossils and the paleontological data they could provide if properly salvaged and documented could be adversely impacted (damaged or destroyed), rendering them permanently lost.

Indirect impacts typically include those effects that result from the continuing implementation of management decisions and resulting activities, including normal ongoing operations of facilities constructed within a given project area. They also occur as the result of new development in areas that were previously less accessible. This increases the human presence and therefore increases the likelihood of the loss of paleontological resources through vandalism and unlawful collecting. Human activities that increase erosion as a result of stormwater runoff cause indirect impacts to surface and subsurface fossils with damage or destruction during hydrologic transport, weathering, and reburial.

Mitigation Measures and Unavoidable Adverse Impacts

Strategies for mitigating direct impacts to paleontological resources include avoidance of paleontologically sensitive areas and specific localities, in situ preservation of fossil localities, and monitoring of surface-disturbing actions to salvage fossils and associated data and permanently house them in a BLM-approved repository. While most fossils and associated data can be recovered if a paleontological monitoring program is successfully implemented, there is also the inevitable loss of fossils that are accidentally destroyed by excavation equipment before a monitor observes them.

Indirect impacts are difficult to mitigate to below the level of significance, but they can be greatly reduced by increasing public awareness about the scientific importance of paleontological resources through education, community partnerships, and interpretive displays, as well informing the public about penalties for vandalism and unlawful collecting of these resources from public lands.

4.6.3 Alternative A

Actions Proposed under Alternative A that Would Cause Change to Existing Paleontological Resources

Alternative A emphasizes preservation of sensitive paleontological resources within the CTA by preserving the largest acreage of any of the alternatives and by allowing only minimal new infrastructure. A limited amount of land (370.8 acres) would be available for disposal.

Direct and Indirect Impacts

Alternative A would preserve 12,952.5 acres of land and make 370.8 acres available for disposal (see Table 4.6-1). This alternative includes all 436 fossil localities that have been recorded from within the CTA study area, including the 181 major fossil localities. Direct impacts to paleontological resources would be anticipated with construction activities if these intersected the locations of previously unrecorded surface fossils and subsurface fossils. Indirect impacts would be anticipated to occur by facilitating access to parts of the CTA that were previously less accessible. Because it preserves the largest area of the LVF and encompasses all of the known paleontological localities, Alternative A would have the lowest potential for direct and indirect adverse impacts to paleontological resources out of all the alternatives.

Mitigation Measures and Unavoidable Adverse Impacts

There are four recommended components to mitigation under all CTA alternatives that are designed to achieve the BLM's paleontological resource management goals and objectives. The locations and amounts of mitigation needed will vary by alternative, and mitigation requirements will be consistent with resource management policies of the BLM or other current CTA management authority. Mitigation measures under Alternative A are summarized below and are provided in greater detail for all alternatives in Section 4.6.9, "Paleontological Mitigation Definitions and Procedures." The four interrelated paleontological mitigation components include the following:

1. Collection of all previously recorded scientifically significant surface fossils that will not be preserved or displayed in situ from within the boundaries of the CTA as soon as feasible in order to prevent loss from vandalism, theft, and natural weathering processes. Collection would be housed in a BLM-approved repository (i.e., museum).
2. Mitigation monitoring of all surface-disturbing development activities in order to prevent destruction of scientifically significant subsurface fossils contained within strata of the LVF.
3. Development of in situ paleontological interpretive displays, which may include fossil specimens, and in situ preservation of paleontologically sensitive areas and key fossil localities.
4. Under the direction of the CTA management authority, establishment of an ongoing paleontological survey and monitoring program designed to periodically check for newly exposed fossil remains and monitor the status of in situ preserved localities.

Mitigation of direct impacts under Alternative A will include monitoring of surface-disturbing activities, salvage of unearthed fossils, and transfer of these fossils to a BLM-approved repository, where they will be housed in perpetuity and available for scientific research, education, and display. Mitigation of indirect impacts will include the regulation of public access to the CTA by promoting the use of established roads and trails, providing educational interpretive displays highlighting the paleontological resources of the area, protecting in situ fossils associated with interpretive displays with protective barriers, and generally educating the community about the scientific importance of the paleontological resources of the LVF.

4.6.4 Alternative B (BLM Preferred Alternative)

Actions Proposed under the Preferred Alternative that Would Cause Change to Existing Paleontological Resources

Alternative B emphasizes protection of the hydrologic functioning of the ULVW and other sensitive resources. This alternative protects the LVF, ephemeral wash plant communities, and sensitive plant habitats.

Direct and Indirect Impacts

Alternative B would preserve 10,495.6 acres of land and make 2,827.5 acres available for disposal (see Table 4.6-1). Like Alternative A, this alternative includes all 436 fossil localities that have been recorded from within the CTA study area, including the 181 major fossil localities. The types and causes of direct and indirect impacts under this alternative would be similar to those for Alternative A. Direct impacts to paleontological resources would be anticipated with construction activities if these intersected the locations of previously unrecorded surface fossils and subsurface fossils. New development under the Alternative B would result in indirect impacts by facilitating access to fossil localities that were previously less accessible, potentially leading to increased unlawful fossil collection or vandalism.

Alternative B has the second-lowest potential for direct and indirect impacts to paleontological resources, after Alternative A. It has a higher potential for direct, adverse impacts than Alternative A only because it preserves less land and includes more new development that could disturb buried resources.

Mitigation Measures and Unavoidable Adverse Impacts

Mitigation components and unavoidable adverse impacts are described for Alternative A. Under the Preferred Alternative, any ground-disturbing activity in the LVF would require a qualified paleontologist on-site and would require a Discovery Plan in the event that fossils are found.

Because it has a higher potential for direct and indirect adverse impacts to paleontological resources than Alternative A, Alternative B could require a greater paleontological mitigation effort. Mitigation measures would be similar to those described for Alternative A. Increased public awareness of paleontological resources could lead to more fossil discoveries by visitors that will then be brought to the attention of the CTA managing authority and paleontologists so that these fossils can be preserved. Off-trail hiking opportunities should be restricted to those areas in which surface fossils have already been collected or are otherwise less sensitive.

4.6.5 Alternative C

Actions Proposed under Alternative C that Would Cause Change to Existing Paleontological Resources

Alternative C emphasizes opportunities for new development outside the CTA while continuing to meet the conservation purpose and need of the SEIS.

Direct and Indirect Impacts

Alternative C would preserve 6,362.3 acres of land and make 6,961.0 acres available for disposal (see Table 4.6-1). Unlike Alternatives A and B, this alternative includes 434 of the 436 known fossil localities

within the CTA study area, including 180 of the 181 major fossil localities. Thus, a total of two fossil localities would be located outside the CTA.

The types and causes of direct and indirect impacts under this alternative would be similar to those for Alternative A. Alternative C has the third-lowest potential for direct and indirect impacts to paleontological resources, after Alternatives A and B. It has a higher potential for direct, adverse impacts than these alternatives because it preserves less land within the CTA and assumes the construction of additional infrastructure, which could destroy buried resources. It has a higher potential for indirect, adverse impacts because it provides greater access to paleontologically sensitive areas.

Mitigation Measures and Unavoidable Adverse Impacts

Mitigation components and unavoidable adverse impacts are described for Alternative A.

Because it has a higher potential for direct and indirect adverse impacts to paleontological resources than Alternatives A and B, Alternative C would require a greater paleontological mitigation effort because it allows for a greater amount of surface disturbance within the CTA. Direct impact mitigation measures would be identical to those under Alternative A. In addition, however, two fossil localities (one of which is major) would be located outside the CTA and would require mitigation. Mitigation measures for indirect impacts would also be identical to those under Alternative A, with the addition of allowing non-mechanized cross-country travel in areas in which surface fossils have already been collected or are otherwise less sensitive.

4.6.6 Alternative D

Actions Proposed under Alternative D that Would Cause Change to Existing Paleontological Resources

Alternative D emphasizes the protection of sensitive resources within the CTA while supporting private development, which could occur outside the CTA boundary. Under this alternative, there is a greater potential for urban runoff into the ULVW than under Alternatives A–C.

Direct and Indirect Impacts

Alternative D would preserve 5,301.4 acres of land and make 8,022.7 acres available for disposal (see Table 4.6-1). This alternative includes 422 of the 436 known fossil localities within the CTA study area, including 175 of the 181 major fossil localities. Thus, a total of 14 fossil localities would be excluded from the CTA.

The types and causes of direct and indirect impacts under this alternative would be similar to those under Alternative A. However, additional adverse impacts would potentially occur during construction excavations for new development.

Although Alternative D preserves more land within the CTA than Alternative E and the No-Action Alternative and less land than within the CTA than Alternatives A–C, it also assumes the greatest amount of acreage of infrastructure development within the CTA (633 acres). While Alternative D preserves less of the LVF than Alternatives A–C and excludes 14 fossil localities from the CTA, it preserves a net larger area than Alternative E and the No-Action Alternative. Therefore, it has the fourth-largest potential for direct and indirect impacts to paleontological resources, after Alternatives A–C.

Mitigation Measures and Unavoidable Adverse Impacts

Mitigation components and unavoidable adverse impacts are described for Alternative A.

Because it has a higher potential for direct and indirect adverse impacts to paleontological resources than Alternatives A–C, Alternative D would require a greater paleontological mitigation effort because it allows for a greater amount of surface disturbance within the CTA. Mitigation measures for direct impacts would be identical to those under Alternative A. In addition, however, 14 fossil localities (six of which are major) would be located outside the CTA and would require mitigation. Mitigation measures for indirect impacts would also be identical to those under Alternative A, with the addition of locating new development in areas in which surface fossils have already been collected or are otherwise less sensitive.

Unavoidable adverse impacts consist of the loss of 14 known fossil localities that would not be protected within the alternative boundary. Additionally, paleosols and stratigraphy within areas of the LVF not preserved within the alternative boundary would be lost and unavailable for future research and study.

4.6.7 Alternative E

Actions Proposed under Alternative E that Would Cause Change to Existing Paleontological Resources

Alternative E leaves 10,010 acres available for disposal while providing for the continued protection of Eglington Preserve and Tule Springs. Under this alternative, waters flowing down the alluvial fans of the Sheep and Las Vegas ranges would not continue in their current condition.

Direct and Indirect Impacts

Alternative E would preserve 3,313.8 acres of land and make 10,010.3 acres available for disposal (see Table 4.6-1). This alternative includes 318 of the 436 known fossil localities within the CTA study area, including 139 of the 181 major fossil localities. Thus, a total of 118 fossil localities would be excluded from the CTA.

The types and causes of indirect impacts under this alternative would be similar to those under Alternative A. However, additional adverse impacts would potentially occur during construction activities. Additional indirect impacts under this alternative would be possible as a result of the increased human presence within the CTA, the relatively smaller size of the CTA, and the resulting closer proximity of private development.

Alternative E has a greater potential for direct and indirect impacts to paleontological resources than Alternatives A–D. It has a greater potential for direct, adverse impacts because it preserves less land within the CTA and allows for disturbance of the LVF within the CTA resulting from new development. Alternative E has a greater potential for indirect, adverse impacts than the other action alternatives because it would provide less of an overall buffer to development and facilitate greater access to sensitive areas within the CTA by road.

Mitigation Measures and Unavoidable Adverse Impacts

Alternative E would require the greatest amount of paleontological mitigation of all the action alternatives, and assuming that mitigation would be required for the disposal of CTA lands under the No-Action Alternative, it would be second only to the No-Action Alternative in the mitigation effort needed

to reduce adverse impacts to below the level of significance. Mitigation measures for direct impacts would be identical to those under Alternative A. Mitigation measures for indirect impacts would be identical to those under Alternative A, with the addition of new development in areas in which surface fossils have already been collected or are otherwise less sensitive.

Unavoidable adverse impacts consist of the loss of 118 known fossil localities, which would not be protected within the alternative boundary. Also, paleosols and stratigraphy within areas of the LVF not preserved within the alternative boundary would be lost and unavailable for future research and study.

4.6.8 No-Action Alternative

Actions Proposed under the No-Action Alternative that Would Cause Change to Existing Paleontological Resources

Under the No-Action Alternative, the entire CTA, with the exception of Eglington Preserve and Tule Springs, would be available for disposal in accordance with applicable laws and with the stipulations established by the Conservation Agreement.

Direct and Indirect Impacts

The No-Action Alternative would preserve 1,448.2 acres of land and make 12,174.5 acres available for disposal (see Table 4.6-1). This alternative includes 82 of the 436 known fossil localities within the CTA study area, including 22 of the 181 major fossil localities. Thus, a total of 354 fossil localities would be excluded from the CTA.

The types and causes of direct and indirect impacts under this alternative would be similar to those under Alternative A. However, additional direct and indirect impacts would be anticipated as a result of increased public access associated with greater development within the CTA, the relatively small geographic area encompassed by the CTA, compared with the action alternatives, and the resulting closer proximity of private development. Of all the alternatives, the No-Action Alternative has the highest potential for direct and indirect adverse impacts to paleontological resources because it has the greatest likelihood of cumulative surface disturbance to the LVF, includes the smallest geographic area (1,100 acres) within the CTA, and excludes the largest number of fossil localities.

Mitigation Measures and Unavoidable Adverse Impacts

Assuming that mitigation would be required for the disposal of CTA lands under the No-Action Alternative, this alternative would require the greatest amount of paleontological mitigation of all the alternatives in order to reduce adverse impacts to below the level of significance. This would include mitigation of 354 known fossil localities that would be excluded from the CTA. Mitigation measures for direct and indirect impacts would be identical to those under Alternative A.

Unavoidable adverse impacts consist of the loss of 354 known fossil localities that would not be protected within the alternative boundary. Additionally, paleosols and stratigraphy within areas of the LVF not preserved within the boundary would be lost and unavailable for future research and study.

4.6.9 Paleontological Mitigation Definitions and Procedures

As a nonrenewable resource, paleontological resources are unique. At the time fossils are discovered during paleontological surveys or mitigation-monitoring of ground-disturbing actions, many have already

been subjected to a variety of destructive processes. These include predation, scavenging, disarticulation of skeletal remains, transport, primary weathering, diagenesis (physical changes in rock that occur over time, such as compaction, cementation, mineral replacement), erosion, secondary weathering, and if discovered during monitoring, additional damage that may have occurred during the surface-disturbing action that led to fossil discovery. Unlike other resources, it is difficult to develop measurable performance standards for paleontological mitigation because 1) fossils have been damaged by natural processes prior to their discovery during a paleontological survey or during paleontological monitoring; 2) subsurface fossils are often further damaged by construction activities that reveal their presence to paleontological monitors; and 3) there is no way to quantify how many fossils are preserved in the sedimentary deposits underlying a given site but were not exposed during the ground-disturbing action. Therefore, the absence of fossils would not indicate failure of the mitigation measures. Paleontological mitigation seeks to discover, via survey or monitoring, as many significant fossils as possible prior to their destruction during human-caused surface disturbance. Measurable performance standards in paleontology apply to survey and mitigation-monitoring procedures, which ensures that fossil localities are documented thoroughly and accurately and that fossils are collected in accordance with professional paleontological standards and agency guidelines.

The need for and scope of all paleontological mitigation projects will be determined using the current version of the BLM *Paleontology Resources Management Manual and Handbook* (H-8270-1) (BLM 1998b), which is presently undergoing revision. Scopes of work for all paleontological mitigation projects will be developed by the BLM Authorized Officer or Paleontology Coordinator at the BLM Las Vegas Field Office in consultation with a BLM-permitted Paleontologist/Principal Investigator who is knowledgeable about the paleontology of the LVF. For larger or more complex mitigation projects, the BLM Regional Paleontologist responsible for Nevada will also be consulted.

As stated in Chapter 3, 436 fossil localities have been previously recorded within the CTA study area in sedimentary deposits of the late Pleistocene LVF. In this chapter, impacts to paleontological resources that are anticipated under each of the proposed alternatives have been evaluated, and general mitigation recommendations have been provided. As discussed in Section 4.6.3, "Actions Proposed under all Alternatives that Would Cause Change to the Existing Paleontological Resources," there are four recommended components to paleontological mitigation under all CTA alternatives, and the locations and amounts of mitigation recommended vary by alternative. Following is a more detailed presentation of paleontological mitigation procedures for each of the four components to supplement the recommendations made for each CTA alternative.

Collection of Surface Fossils

As soon as allowable following the issuance of the ROD for this SEIS, it is recommended that all previously recorded *scientifically significant* surface fossils (and associated buried remains) that will not be preserved or displayed in situ within the CTA be salvaged, along with associated data, and transferred to an approved BLM repository for preparation, identification, curation, and storage. This will mitigate future losses resulting from vandalism, theft, and the natural processes of weathering and erosion. The determination of the scientific significance of fossils at each locality and the decision regarding which localities should be preserved in situ and considered for use in interpretive displays should be made by the BLM in consultation with a BLM-permitted Paleontologist/Principal Investigator who has specialized knowledge about and expertise in the paleontology of the LVF.

During fossil collection at either previously recorded or newly discovered fossil localities, if damage to a scientifically significant fossil or assemblage of fossils is determined to be unavoidable, it may be necessary to avoid the locality in order to prevent irreparable damage to the resource. Avoidance should also be considered if a known fossil locality contains critical scientific information and should be left undisturbed for later scientific evaluation.

Monitoring of Surface Disturbance

Paleontological monitoring includes inspection of exposed rock surfaces and microscopic examination of sedimentary matrix to determine whether fossils are present. This work occurs during surface-disturbing activities such as excavations for the construction of roads, trails, underground utility trenches, transmission lines poles, buildings, and other facilities. Monitoring is conducted by approved paleontological monitors or field agents (supervisors) listed on Line 8 of a BLM Paleontological Resource Use Permit under the direction of a Principal Investigator.

Under the direction of a BLM-permitted Principal Investigator who has knowledge of the density of fossil occurrences within the different units and lithofacies of the LVF, monitoring may take place continuously, consist of spot-checks of construction excavations, or be temporarily suspended if appropriate (e.g., grading fill material), depending on the probability of locating significant fossils. Paleontological monitors follow earth-moving equipment and examine excavated sediments and excavation sidewalls for evidence of significant paleontological resources. Bulk matrix samples may be collected for screenwashing in order to collect microfossils. Monitoring staff has the authority to temporarily divert grading away from exposed fossils in order to professionally and efficiently salvage the fossil specimens and collect associated data. All efforts to avoid delays to project schedules are made.

If any subsurface bones or other potential fossils are found by construction personnel during construction when no paleontological monitor is present, work in the immediate area will cease, and the BLM Authorized Officer (or other CTA managing authority) and Principal Investigator will be notified to evaluate the significance of the find. Once salvage or other mitigation measures is complete, the BLM Authorized Officer will notify the construction supervisor that construction work at the discovery site can resume.

Under the supervision of the Field Agent, fossils are salvaged and associated resources are retrieved. The salvaged fossils are then transported to a secure and properly equipped paleontological laboratory for processing.

A final paleontological monitoring report will provide all information requested in the most current version of the BLM Paleontology Manual and Handbook (or as required by an alternative CTA managing authority). This includes, but is not limited to, a discussion of the results of the project with respect to the research design, an evaluation and analysis of all fossils collected (including an assessment of their significance, age, and geological context), an itemized inventory of fossils collected, a confidential appendix of locality and specimen data with locality maps and photographs, an appendix of curation agreements and other appropriate communications, and if applicable, a copy of the project-specific paleontological mitigation plan.

On-Site Fossil Preservation and Paleontological Displays

In order to be consistent with the paleontological resource management and conservation objectives that the BLM has identified for the CTA, in situ paleontological preservation areas should be established, and important paleontological localities that are essential to understanding the paleoecology of the LVF should be preserved in situ. This mitigation component may include the use of fossils in educational interpretive displays located within the CTA. The determination of scientific significance of fossils at each fossil locality, the delineation of paleontological preservation areas, the decision regarding which localities should be preserved in situ, and decisions regarding which fossils should be considered for use in interpretive displays (if any), should be made by the BLM (or other CTA managing authority) in consultation with a BLM-permitted Paleontologist/Principal Investigator who has specialized knowledge and expertise on the paleontology of the LVF.

Ongoing Survey and Resource Monitoring Program

Under the direction of the CTA management authority, an ongoing paleontological monitoring program designed to periodically survey for newly exposed fossil localities and monitor the status of in situ preserved localities within the CTA is critical.

Annual surveys conducted after the end of spring rains would locate newly eroded fossils and provide an opportunity to collect and document them prior to potential loss through unlawful collection or damage by weathering. Many such newly eroded fossil occurrences could be mapped and periodically monitored without collection until conditions warrant (i.e., identifiable remains are exposed). Inspections of paleontological preservation areas, preserved fossil localities, and fossils used in interpretive displays would be important in order to maintain proper conservation conditions for the paleontological resources involved. Paleontological surveys and monitoring of known sites would also provide educational opportunities for the community.

4.7 VISUAL RESOURCES

The analysis of impacts to visual resources is an assessment of changes to the landscape, not just the most scenic or striking landscapes, that would be caused by implementation of each of the alternatives. As discussed in Chapter 3, the landscape is composed of the landform and water bodies, the vegetation that grows on the land, and the presence of human modifications to the land. Those modifications include structures and changes to the land, water, and vegetation, such as development of an open-pit mine, impoundment of a river (creation of a reservoir), or clear-cutting of a forest. Table 4.7-1 provides a comparison of visual impacts between the alternatives.

4.7.1 Analysis Approach and Assumptions

For each alternative, the impact analysis is three-tiered. The first level of analysis is a discussion of changes to the landscape in the CTA study area as a whole, resulting from the actions prescribed under each alternative, both on lands inside and outside the CTA. The second level of analysis is an assessment of impacts resulting from those same actions as seen from five key observation points (KOPs) near and adjacent to the project area. The KOPs are critical viewpoints of typical landscapes in the project area that have been selected to represent the views encountered by a large number of people. The third level of analysis is an assessment of whether the proposed changes to the landscape would meet the BLM objectives for management of visual resources, as prescribed in the Las Vegas RMP and LVVDB FEIS (BLM 1998a, 2004a). The location and rationale for the selection of KOPs are identified below.

Table 4.7-1. Comparison of Visual Impacts, by Visual Resource Management Objectives and Alternative

Resource	A (acres)	B (Preferred) (acres)	C (acres)	D (acres)	E (acres)	No Action (acres)
CTA Study Area	13,622.7	13,622.7	13,622.7	13,622.7	13,622.7	13,622.7
CTA Boundary	12,952.5	10,495.6	6,362.3	5,301.4	3,313.8	1,448.2
Consistent with VRM Objectives	13,251.9	10,495.6	6,661.8	5,600.0	3,612.4	1,448.2
Not Consistent with VRM Objectives	370.8	2,827.5	6,960.9	8,022.7	10,010.3	12,174.5

Key Observation Points

Five KOPs are identified to represent typical views of the project area to residents and visitors to Las Vegas. The selection of KOPs is consistent with BLM policy (BLM 1986b).The KOPs are selected to geographically represent views of the entire project area and to represent views from places where large numbers of people reside and gather. They are also selected to represent people who desire to view the landscape in the project area (see Figure M.1-1 in Appendix M).

KOP 1 is located on the patio of the Paiute Reservation golf club house. This location represents panoramic views of the northwestern portion of the CTA study area as seen by a large number of year-round visitors to the golf course. In addition, this view was selected because the Las Vegas Paiute Tribe expressed concern about how the development of public lands adjacent to the Paiute Reservation would change the scene, as viewed from the Paiute Reservation, and what effect those changes would have on use of Paiute Reservation lands. This KOP also represents the views of travelers along U.S. Highway 95.

KOP 2 is located in the parking area at the fishing pond located next to the Tule Springs historic buildings in Floyd Lamb Park. From this location, the view is northward to the west-central portion of the CTA study area. This location represents views of visitors to the park and residents of adjacent neighborhoods. The views from this KOP are typically of the bajada across LVW in the CTA study area to the base of the Sheep Mountain and Las Vegas ranges and Gass Peak on the DNWR. Views are not wide open or panoramic but are somewhat obstructed by the vegetation in the park and adjacent housing development.

KOP 3 is located in the parking area at the model airplane park at McCool Regional Park. From this location, the view is northward to the east-central portion of the CTA study area. The rugged mountains of the DNWR are in the background, and the bajadas and LVW of the CTA study area are in the foreground and middle ground. Views are panoramic and unobstructed, and this location represents the views of visitors to McCool Regional Park and residents of adjacent neighborhoods.

KOP 4 is located along Grand Teton Drive near Eglington Preserve. The view is northward, looking into the southeastern portion of the CTA study area. Views are panoramic and unobstructed. The LVW and bajadas of the CTA study area are in the foreground, and the bajadas and mountains of the DNWR are in the middle ground and background. This location represents the views of future residents of urban development planned south of Grand Teton Drive and Eglington Preserve to the 215 Beltway.

KOP 5 is located at the intersection of the 215 Beltway and Lone Mountain Road. The view is to the northeast and panoramic and includes most of the CTA study area. The Cities of Las Vegas and North Las Vegas are in the foreground and middle ground, and the CTA study area and mountains of the DNWR are in the background. This location represents the views of residents who reside at slightly higher elevations around the perimeter of the LVV, as well as travelers along the beltway.

A visual contrast rating worksheet (BLM Form 8400-4) was prepared to analyzed the effects proposed development would have on the characteristic landscape, as viewed from each of the five KOPs. Not every action assumed for implementation under each alternative was analyzed. The analysis looked at the actions that would have the most potential to affect (change) the landscape, whether inside or outside the proposed CTA. In addition to the contrast rating analyses (worksheets), visual simulations were prepared for each KOP to depict how the landscape would change, as seen from that location. See Appendix M for visual contrast ratings and simulations.

Analysis Assumptions

Because every aspect of future use and development of lands in the CTA study area is not known at this time, it is necessary to make assumptions on which to base and guide the impact analysis. For the purpose of this analysis:

1. Public lands not included in the CTA under any alternative would be disposed of and potentially developed. Most of the lands would be developed residential, but other development would include commercial, light industrial, public facilities, school, parks, and open space.
2. BLM's VRM objectives apply only to public lands, although the effects of disposal and development will be disclosed for lands that leave public ownership for the purpose of this analysis.

4.7.2 Impact Thresholds

Changes to the characteristic landscape will be considered significant when those changes are not in conformance with BLM management objectives for visual resources. All lands in the CTA are managed as VRM Class III. The objective of Class III is to partially retain the existing character of the landscape. The level of change can be moderate, and management activities may attract attention but should not dominate the view (see Section 3.7.2, "Bureau of Land Management Direction"). When changes, or impacts, to the landscape do not meet this objective, they will be considered significant.

4.7.3 Actions Proposed under all Alternatives that Would Cause Change to the Existing Visual Resources

The following action would cause change to the existing visual resources:

- BLM would reclaim and rehabilitate unauthorized surface disturbances (e.g., dump sites, trails, and vehicle tracks) to a more natural condition.

4.7.4 Alternative A

Actions Proposed under Alternative A that Would Cause Change to Existing Visual Resources

In addition to the actions common to all alternatives, the following action would be implemented under this alternative and would affect the characteristic landscape:

- A total of 370.8 acres of the study area outside the proposed CTA would be available for disposal and potential private development. The lands outside the CTA available for disposal are located at McCool Park and the Grand Teton substation.

Direct and Indirect Impacts

CONSERVATION TRANSFER AREA

Under this alternative, 12,952.5 acres of the study area would be managed as the CTA, an increase of 7,952.5 acres (159%) over the original CTA boundary (see Table 2.4-1). Management emphasis would focus on preservation of sensitive resources values and the natural functioning of the ULVW. Generally,

the CTA would remain undeveloped, although some development would be constructed that would be apparent on the landscape.

Lands in the CTA study area that were not included in the proposed CTA boundary under this alternative, 370.8 acres, would be available for disposal and potential development (see Table 2.4-2).

KOP 1—From KOP 1, actions proposed in the CTA under this alternative that would be visible would have the same effect on the characteristic landscape as that described in "Conservation Transfer Area" above.

KOP 2—From KOP 2, actions proposed in the CTA under this alternative that would be visible would have the same effect on the characteristic landscape as that described in "Conservation Transfer Area" above.

KOP 3—From KOP 3, actions proposed in the CTA under this alternative that would be visible would have the same effect on the characteristic landscape as that described in "Conservation Transfer Area" above.

KOP 4—From KOP 4, actions proposed in the CTA under this alternative that would be visible would have the same effect on the characteristic landscape as that described in "Conservation Transfer Area" above.

KOP 5—From KOP 5, actions proposed in the CTA under this alternative that would be visible would have the same effect on the characteristic landscape as that described in "Conservation Transfer Area" above. The distance from the KOP to the CTA study area would reduce the visibility and thus the impact of new developments and reclamation projects, but they may still be visible to some degree.

BLM VISUAL RESOURCE MANAGEMENT OBJECTIVES

VRM objectives for public lands in the CTA are Class III. Under the BLM VRM program, the objective of Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape can be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape (BLM 1986a).

The level of change to the landscape was determined to be moderate, and proposed development was determined to be consistent with objectives. Any measure to restore the natural characteristics of the landscape would only support and enhance BLM objectives for management of the landscape. Since the level of landscape change resulting from development proposed under this alternative would be consistent with VRM Class III objectives, the impacts would not be significant. See Appendix M for visual contrast ratings.

Mitigation Measures and Unavoidable Adverse Impacts

The following suggested measures would reduce but not eliminate the impacts of development to the characteristic landscape of the CTA:

1. Color the concrete of any development to match the predominant color in the surrounding landform.
2. Paint facilities a suitable color to reduce the contrast of the structures on the landscape.

3. Use the natural topography and vegetation on the landscape to screen the view of development in the CTA.

Even with implementation of mitigating measures, there would be impacts to the visual resources of the CTA. Under this alternative, measures are suggested to reduce the evidence of human-made developments on the landscape of the CTA (see 1–3 above), and those project design techniques would reduce the presence of proposed facilities and make them more compatible with the natural elements of the landscape. BLM's VRM objectives apply only to public lands; once lands leave public ownership, objectives would not apply. In the end, however, proposed development would still be noticeable within the landscape. However, while these features may be seen, they would not predominate, and the natural landform and vegetation cover would still stand out in the view. Thus, the impacts to visual resources (the landscape) within the CTA following mitigation would not be significant.

4.7.5 Alternative B (BLM Preferred Alternative)

Actions Proposed under Alternative B that Would Cause Change to Existing Visual Resources

In addition to the actions common to all alternatives, the following action would be implemented under this alternative and would have an impact to the characteristic landscape:

- A total of 2,827.5 acres of the CTA study area outside the proposed CTA boundary would be available for disposal and potential private development. The lands outside the CTA available for disposal are north and east of the Paiute Reservation; a 1,200-foot strip of land on the eastern edge of the study area, adjacent to the southeastern boundary of the CTA; at McCool Regional Park; and at the Grand Teton substation.

Direct and Indirect Impacts

CONSERVATION TRANSFER AREA

Under this alternative, 10,495.6 acres of the study area would be managed as the CTA, an increase of 5,495.6 acres (109%) over the original CTA boundary (see Table 2.4-1). Management emphasis would focus on protecting the natural functioning of the LVW and other sensitive resources while providing for non-motorized recreation opportunities, environmental education, and interpretation. The effects of proposed development under Alternative B on the CTA as a whole would generally be the same as those described under Alternative A, with the following additional effects. Under Alternative B, construction activities would result in additional lines on the landscape as a result of vegetation removal and soil disturbance. Removal of vegetation and exposure of soils for construction activities would leave a noticeable line across the landscape at each location. In addition to vegetation removal and exposure of soils, leveling of the land to facilitate construction activities would leave an apparent bench across the gently sloping landform. This change in land form would further accentuate the visibility of new development.

This alternative would make 2,827.5 acres (see Table 2.4-2) of lands available for disposal and urban development. Most of this acreage would occur in three parcels. Two parcels would lie adjacent to the northern and eastern boundaries of the Paiute Reservation, and the third would lie on the eastern edge of the study area, adjacent to the southeastern boundary of the CTA. Given the current growth in the LVV, it is assumed these lands would be developed. The development, however, would convert predominantly undeveloped landscapes to high-density urban development consisting of buildings, roads, utility lines, and urban landscaping—a transformation of the landscape.

KOP 1—The changes to the landscape that would be viewed from this KOP under this alternative would be the same as those described for KOP 1 under Alternative A.

KOP 2—The changes to the landscape that would be viewed from this KOP under this alternative would be the same as those described for KOP 2 under Alternative A.

KOPs 3 and 4—The changes to the landscape that would be viewed from these KOPs under this alternative would be the same as those described for KOPs 3 and 4 under Alternative A. In addition, under this alternative, high-density urban development of lands outside the CTA on the southeastern boundary of the CTA would be visible from these KOPs, with the same effects as those described in "Conservation Transfer Area" above.

KOP 5—The changes to the landscape that would be viewed from this KOP under this alternative would be the same as those described for KOP 5 under Alternative A. The distance from the KOP to the CTA study area would reduce the visibility, and thus impact, of these developments and reclamation projects, but they could still be visible to some degree. The effects on the landscape would be the same as those described in "Conservation Transfer Area" above, but to a reduced degree, given the distance of viewing and anticipated blending in with the existing adjacent city development.

BLM VISUAL RESOURCE MANAGEMENT OBJECTIVES

Under this alternative, within the CTA, consistency of the proposed development with the BLM VRM objectives would be the same as those described under Alternative A. On lands outside the CTA that would be available for disposal, high-density residential, commercial, and light industrial development would not be consistent with Class III VRM objectives. The lands, however, once transferred to private ownership would no longer be subject to those public land management objectives. See Appendix M for visual contrast ratings.

Mitigation Measures and Unavoidable Adverse Impacts

The following measures would reduce but not eliminate the impacts of development to the characteristic landscape of the CTA:

1. Color the concrete to match the predominant color in the surrounding landform.
2. Paint facilities a suitable color to reduce the contrast of the structures on the landscape.
3. Use the natural topography and vegetation on the landscape to screen the view of new development in the CTA.
4. Use design elements, such as colored concrete, to reduce the visibility of new development across the bajadas at the base of the DNWR.

Under this alternative, there would be more development proposed on lands in the CTA study area. Even with more development on lands within the CTA under this alternative, the unavoidable adverse impacts to the visual resources, or the landscape, would be the same as those described under Alternative A. The impacts to visual resources (the landscape) within the CTA following mitigation would not be significant.

4.7.6 Alternative C

Actions Proposed under Alternative C that Would Cause Change to Existing Visual Resources

In addition to the actions common to all alternatives, the following action would be implemented under this alternative and would have an effect on the characteristic landscape:

- A total of 6,961.0 acres of the study area outside the proposed CTA would be available for disposal and potential private development. The lands outside the CTA available for disposal are north and east of the Paiute Reservation, south of the CTA; north of the CTA, between the CTA and the DNWR north of Moccasin Road; north of the CTA, between the CTA and the DNWR north of Grand Teton Drive; at McCool Regional Park; and at the Grand Teton substation.

Direct and Indirect Impacts

CONSERVATION TRANSFER AREA

Under this alternative, 6,362.3 acres of the study area would be managed as the CTA, an increase of 1,362.3 acres (27%) over the original CTA boundary (see Table 2.4-1). The impacts of proposed development under Alternative C on the CTA as a whole would be the same as those described under Alternative B but would also include potential urban development on 6,961.0 acres of lands available for disposal.

Most of this 6,961.0 acres (see Table 2.4-2) would occur in four parcels. Two parcels would lie adjacent to the northern and eastern boundaries of the Paiute Reservation, south of the CTA. The third would lie north of the CTA between the CTA and DNWR, north of Moccasin Road. The fourth would lie north of the CTA between the CTA and DNWR, north of Grand Teton Drive. Given the current growth in the LVV, it is assumed these lands would be developed. The development, however, would convert predominantly undeveloped landscapes to high-density urban development consisting of buildings, streets, utility lines, and urban landscaping—a transformation of the landscape.

Construction activities would result in both short- and long-term changes to the wash landscape. In the short term, during construction, vegetation clearing would change the form and texture of vegetation cover. Clearing would introduce a large opening in a continuous pattern of the medium-textured element of the environment. Following construction, the opening would remain as smaller shrubs and grasses regrow. The texture would change from the medium texture of the native vegetation community to the smoother texture of shrubs and grasses. Over the long term, as larger shrubs and trees invade, the texture would return to its original condition, and the change in vegetation form (opening) would revert to its original condition—a continuous cover of riparian species.

KOP 1—From KOP 1, substantial development proposed in the CTA under this alternative that would be visible includes construction of the detention basin at the upper end of the LVW. New development would have the same effect on the characteristic landscape as that described in "Conservation Transfer Area" above.

KOP 2—From KOP 2, the primary view will be of the bajada across the LVW. This land would be outside the CTA and would be expected to be developed for residential, commercial, and light industrial uses. That development would be visible from KOP 2.

KOPs 3 and 4—The changes to the landscape that would be viewed from these KOPs under this alternative would be the same as those described for KOPs 3 and 4 under Alternative B.

KOP 5—From KOP 5, the most noticeable feature on the landscape would be the urban development adjacent to the northwestern and southeastern portions of the CTA. At the distance from the KOP to the CTA study area, a person might be able to pick out other developments; the predominant view on the landscape would be urban development. From KOP 5, urban development would appear as an extension of the existing Cities of Las Vegas and North Las Vegas. This development would have the same impact to the characteristic landscape as that described in "Conservation Transfer Area" above.

BLM VISUAL RESOURCE MANAGEMENT OBJECTIVES

Under this alternative, within the CTA, consistency of the proposed development with the BLM VRM objectives would be the same as that described under Alternative A, with the following addition. Construction activities would add noticeable features to the characteristic landscape of the northwestern portion of the CTA. While the development would be apparent from KOP 1, in the long term, following reclamation, it would not dominate the scene within the CTA. Overall, the undisturbed character of the CTA would remain, especially in contrast to adjacent urban development outside the CTA, and impacts would not be considered significant.

Mitigation Measures and Unavoidable Adverse Impacts

The following measures would reduce but not eliminate the impacts of development to the characteristic landscape of the CTA:

1. Color the concrete to match the predominant color in the surrounding landform.
2. Paint facilities a suitable color to reduce the contrast of the structures on the landscape.
3. Use the natural topography and vegetation on the landscape to screen the view of new development in the CTA.
4. Reshape and recontour cut and fill slopes that cross the natural grade/slope of the bajada.
5. Replant vegetation to accelerate reclamation of disturbed surfaces resulting from construction of the basin.

Under this alternative, there would be substantially more development assumed on lands in the CTA. Even with more development on lands within the CTA under this alternative, the unavoidable adverse impacts to the visual resources, or the landscape, would be the same as those described under Alternative A. The impacts to visual resources (the landscape) within the CTA following mitigation would not be significant.

4.7.7 Alternative D

Actions Proposed under Alternative D that Would Cause Change to Existing Visual Resources

In addition to the actions common to all alternatives, the following action may be implemented under this alternative and may have an impact to the characteristic landscape:

- A total of 8,022.7 acres of the study area outside the proposed CTA would be available for disposal and potential private development. The lands outside the CTA available for disposal are north and east of the Paiute Indian Reservation, south of the CTA; north of the CTA between the

CTA and DNWR, north of Moccasin Road; and north of the CTA between the CTA and DNWR, north of Grand Teton Drive.

Direct and Indirect Impacts

CONSERVATION TRANSFER AREA

Under this alternative, 5,301.4 acres of the study area would be managed as the CTA, an increase of 301.4 acres (6%) over the original CTA boundary (see Table 2.4-1). The impacts of proposed development under Alternative D to the CTA, as a whole, would be the same as those described under Alternative C but would also include potential urban development on 8,022.7 acres of lands available for disposal.

Under this alternative, 8,022.7 acres would not be included in the CTA and would be available for disposal and potential development (see Table 2.4-2). These lands would lie in the same locations as those described under Alternative C. The impact of disposal and development to the landscape would be the same as that described under Alternative C, but applicable to a larger land area.

KOP 1—From KOP 1, substantial development proposed in the CTA under this alternative would be visible. These developments would have the same effect on the characteristic landscape as those described in "Conservation Transfer Area" above.

KOP 2—From KOP 2, the primary view would be the same as that described under Alternative C for KOP 2.

KOPs 3 and 4—The view from KOPs 3 and 4 would be that same as that described under Alternative C. The impacts to the landscape would be the same as those described in "Conservation Transfer Area" above.

KOP 5—From KOP 5, the primary view of landscape changes would be the same as that described under Alternative C.

BLM VISUAL RESOURCE MANAGEMENT OBJECTIVES

Under this alternative, within the CTA, the proposed development would be in compliance with the BLM VRM Class III objectives and would be the same as that described under Alternative C. Overall, the undisturbed character of the CTA would remain, especially in contrast to adjacent urban development outside the CTA, and impacts would not be significant.

On lands adjacent to the CTA that would be available for disposal, high-density residential, commercial, light industrial, and transportation, development would not be consistent with Class III VRM objectives. The lands, however, once transferred to private ownership, would no longer be subject to those public land management objectives. See Appendix M for visual contrast ratings.

Mitigation Measures and Unavoidable Adverse Impacts

The following measures would reduce but not eliminate the impacts of development to the characteristic landscape of the CTA:

1. Color the concrete to match the predominant color in the surrounding landform.
2. Paint facilities a suitable color to reduce the contrast of the structures on the landscape.
3. Use the natural topography and vegetation on the landscape to screen the view of new development in the CTA.

4. Reshape and recontour cut and fill slopes that cross the natural grade/slope of the bajada.
5. Replant vegetation to accelerate reclamation of disturbed surfaces resulting from construction of the two basins.

Under this alternative, there would be substantially more development proposed on lands in the CTA. Even with more development on lands within the CTA under this alternative, the unavoidable adverse impacts to the visual resources, or the landscape, would be the same as those described under Alternative A. The impacts to visual resources (the landscape) within the CTA following mitigation would not be significant.

4.7.8 Alternative E

Actions Proposed under Alternative E that Would Cause Change to Existing Visual Resources

In addition to the actions common to all alternatives, the following action would be implemented under this alternative and would have an impact to the characteristic landscape:

- A total of 10,010.3 acres of the study area outside the proposed CTA would be available for disposal and potential private development. The lands outside the CTA available for disposal are the same as those described under Alternative D but include more lands north of the CTA between the CTA and DNWR, north of Grand Teton Drive.

Direct and Indirect Impacts

CONSERVATION TRANSFER AREA

Under this alternative, 3,313.8 acres of the study area would be managed as the CTA, a decrease of 1,686.2 acres (34%) from the original CTA boundary (see Table 2.4-1). Management emphasis would focus on land disposal for private development, management of sensitive resources of the CTA, and natural functioning of the LVW. The impacts of proposed development under Alternative E to the CTA, as a whole, would be the same as those described under Alternative D but would also include potential urban development on 10,010.3 acres of lands available for disposal and construction activities.

Under this alternative, 10,010.3 acres would not be included in the CTA and would be available for disposal and potential development. These lands would lie in the same locations as described under Alternative D but would include more lands north of the CTA between the CTA and DNWR, north of Grand Teton Drive. The impact of disposal and development to the landscape, however, would be the same as that described for Alternative D but applicable to a larger area of land.

KOPs 1 and 2—From these KOPs, the primary view would be the same as described under Alternative D. The impacts to the landscape would be the same as those described in "Conservation Transfer Area" above.

KOPs 3 and 4—From these KOPs, the view would be the same as that described under Alternative D. While the development would still occur, with the impact described under Alternative D, the changes to the landscape would occur on lands adjacent to the CTA. The impacts to the landscape would be the same as those described in "Conservation Transfer Area" above.

KOP 5—From KOP 5, the view of changes to the landscape would be the same as that described under Alternative C.

BLM VISUAL RESOURCE MANAGEMENT OBJECTIVES

Under this alternative, within the CTA, the proposed development would be in compliance with BLM VRM Class III objectives and would be the same as that described for Alternative D. Overall, the undisturbed character of the CTA would remain, especially in contrast to adjacent urban development outside the CTA, and impacts would not be considered significant.

On lands adjacent to the CTA that would be available for disposal, high-density residential, commercial, light industrial, and transportation development would not be consistent with Class III VRM objectives. High-density urban development would dominate the landscape and the view of that landscape, which would be inconsistent with BLM VRM Class III objectives. The lands, however, once transferred to private ownership, would no longer be subject to those public land management objectives. See Appendix M for visual contrast ratings.

Mitigation Measures and Unavoidable Adverse Impacts

The following measures would reduce but not eliminate the impacts of development to the characteristic landscape of the CTA:

1. Color the concrete to match the predominant color in the surrounding landform.
2. Use the natural topography and vegetation on the landscape to screen the view of new development in the CTA.
3. Reshape and recontour cut and fill slopes that cross the natural grade/slope of the bajada.
4. Replant vegetation to accelerate reclamation of disturbed surfaces resulting from construction of the two basins.

Under this alternative, the unavoidable adverse impacts to the visual resources, or the landscape, would be the same as those described under Alternative D. The impacts to visual resources (the landscape) within the CTA following mitigation would not be significant.

4.7.9 No-Action Alternative

Actions Proposed under the No-Action Alternative that Would Cause Change to Existing Visual Resources

In addition to the actions common to all alternatives, the following actions would be implemented under this alternative and would have an impact to the characteristic landscape.

- A total of 12,174.5 acres of the study area outside the proposed CTA would be available for disposal and potential private development. All lands outside Tule Springs and Eglington Preserve would be available for disposal.
- Additional stormwater control facilities, both within and outside the CTA, on the LVW would be considered on a case-by-case basis.

Direct and Indirect Impacts

CONSERVATION TRANSFER AREA

Under this alternative, 1,448.2 acres of the study area would be managed as the CTA, a decrease of 3,551.8 acres (71%) from the original CTA boundary (see Table 2.4-1), including public lands in Tule

Springs and Eglington Preserve. Generally, the CTA would remain undeveloped, although some development would be constructed on the boundary that would be apparent on the landscape.

Many other actions would be implemented under the No-Action Alternative that would alter the landscape scene, including disposal of 12,174.5 acres and potential urban development. All this development would occur outside the CTA, as established under this alternative, but it would transform a generally undeveloped landscape to an urban landscape of dense development.

KOPs 1 and 2—Lands in the CTA would not be visible from these KOPs. However, much of the development planned and under consideration outside the CTA would be visible from these KOPs. The effects of these developments on the landscape are the same as those described in "Conservation Transfer Area" above.

KOP 3—Tule Springs is visible from KOP 3. Developments planned adjacent to this part of the CTA would be visible from this KOP, with impacts as described in "Conservation Transfer Area" above. The impacts to the landscape would be the same as those described in "Conservation Transfer Area" above.

KOP 4—The entire CTA would be visible from KOP 4. The impacts to the landscape, both within and outside the CTA, as seen from this KOP, would be the same as those described for KOP 3 above.

KOP 5—From the distance of KOP 5 to the CTA study area, it would be difficult to see Tule Springs and Eglington Preserve. However, most of the urban development outside the CTA would be visible from this KOP, with the same effects as those described under Alternative C.

BLM VISUAL RESOURCE MANAGEMENT OBJECTIVES

Under this alternative, the only development that would occur in the CTA would be on the edges; no development would occur in the CTA. Thus, planned development would be in compliance with BLM VRM Class III objectives, and impacts would not be significant.

With the exception of Floyd Lamb Park R&PP Act leased lands, proposed development on lands outside the CTA that would be available for disposal and high-density residential, commercial, light industrial, and transportation uses would not be consistent with BLM Class III VRM objectives. High-density urban development would dominate the landscape and the view of that landscape and would be inconsistent with BLM VRM Class III objectives. The lands, however, once transferred to private ownership, would no longer be subject to those public land management objectives.

Mitigation Measures and Unavoidable Adverse Impacts

The following measure would reduce but not eliminate the impacts of development to the characteristic landscape of the CTA:

- Reshape and recontour cut and fill slopes that are disturbed during construction activities.

Under this alternative, the unavoidable adverse impacts to the visual resources, or the landscape, would be the same as those described under Alternative A, although most of the lands would be disposed of and developed for urban purposes. The impacts to visual resources (the landscape) within the CTA following mitigation would not be significant.

4.8 LAND USE

Under the Las Vegas RMP (BLM 1998a), BLM authorized the sale of 25,540 of 51,826 acres of public lands in the LVV. As a result of more rapid growth and development in the LVV than was anticipated in the Las Vegas RMP, this land was sold in just a few years. To respond to the continued demand for public lands for the growth of the valley, BLM prepared the LVVDB FEIS (BLM 2004a) to assess the impacts of selling the remaining 26,286 acres of public lands in the LVV and 22,000 acres authorized for disposal by the Clark County Act of 2002 (PL 107-282). The LVVDB FEIS (BLM 2004a) analyzed the sale of 46,701 acres. Table 4.8-1 shows the impacts to land use from each alternative.

Table 4.8-1. Comparison of Land Use Impacts, by Alternative

Resource	A (acres)	B (Preferred) (acres)	C (acres)	D (acres)	E (acres)	No Action (acres)
CTA Study Area	13,622.7	13,622.7	13,622.7	13,622.7	13,622.7	13,622.7
CTA Boundary	12,952.5	10,495.6	6,362.3	5,301.4	3,313.8	1,448.2
Lands Available for Disposal	370.8	2,827.5	6,961.0	8,022.7	10,010.3	12,174.5
Consistent with the Las Vegas RMP, LVVDB FEIS, and legislation	13,323.3*	13,323.3*	13,323.3*	13,324.1†	13,324.1†	13,622.7

* Alternative includes Eglington Preserve but not Tule Springs.

† Alternative includes Tule Springs but not Eglington Preserve.

4.8.1 Analysis Approach and Assumptions

The decision of the LVVDB FEIS was to be consistent with the Las Vegas RMP for further land disposal, ROW development, and recreation management. The SEIS analyzes the effects of managing for conservation purposes, or disposing and developing, 13,622.7 acres of the remaining 46,701 acres analyzed in the LVVDB FEIS. Each alternative will disclose the acres managed as part of the CTA and acres of lands made available for disposal.

Under each alternative, different areas of land would be managed for conservation purposes as the CTA and, consequently, different areas of land would be available for disposal. For the purposes of this analysis, it is assumed that lands made available for disposal under each of the alternatives would transfer into private ownership and be developed as part of the continued growth of the LVV.

4.8.2 Impact Thresholds

For purposes of this SEIS, impact thresholds for land uses were not identified here because land disposals proposed under any of the alternatives would be in conformance with the Las Vegas RMP.

4.8.3 Actions Anticipated under Each Alternative that Would Cause Change to the Existing Land Uses

Different actions are assumed under each alternative in the CTA, and those actions are shown in Table 4.8-2. The table provides a comparison of the number of acres that would be managed as the CTA, the number of acres of land that would be made available for disposal by alternative. The impact analysis that follows summarizes the information in the table. The details are provided in the table and are extracted from the impact footprint described in Section 4.1. This impact analysis discloses the effects of the actions assumed under each alternative on lands in the CTA that would be made available for disposal and community growth.

Table 4.8-2. Land Uses by Alternative

Use	A	B (Preferred)	C	D	E	No Action
CTA Acres / Disposal Acres	CTA—12,952.5 acres Disposal—370.8 acres	CTA—10,495.6 acres Disposal—2,827.7 acres	CTA—6,362.3 acres Disposal—6,961.0 acres	CTA—5,301.4 acres Disposal—8,022.7 acres	CTA—3,313.8 acres Disposal—10,010.3 acres	CTA—1,448.2 acres Disposal—12,174.5 acres
Lands for Disposal	– McCool Regional Park (N-49747-01) – Grand Teton substation (N-76305)	– Lands north and east of Paiute Reservation – Lands on the eastern edge of the study area adjacent to southeastern boundary of the CTA – McCool Regional Park (N-49747-01) – Grand Teton substation (N-76305)	– Lands north and east of Paiute Reservation – Lands between the CTA and refuge north of Moccasin Road – Lands between the CTA and refuge north of Grand Teton Drive – McCool Regional Park (N-49747-01) – Grand Teton substation (N-76305)	– Lands north and east of Paiute Reservation – Lands between the CTA and refuge north of Moccasin Road – Lands between the CTA and refuge north of Grand Teton Drive – McCool Regional Park would still be developed as a community park	– Lands north and east of Paiute Reservation – Lands between the CTA and refuge north of Moccasin Road – Lands between the CTA and refuge north of Grand Teton Drive – McCool Regional Park would still be developed as a community park	– All lands in the CTA study area except Tule Springs and Eglington Preserve – McCool Regional Park would still be developed as a community park
Recreation Sites and Facilities	Consider recreation sites and facilities on a case-by-case basis	Case-by-case	Case-by-case	Case-by-case	In partnership with adjacent communities and recreation providers	Recreation development limited to R&PP Act leased lands (N-36876-01, N-62830).
Road Rights-of-Way	New road alignments: – Decatur Boulevard (N-76357) – Grand Teton Drive (N-83310) – Aliante Parkway (N-76357)	New road alignments: – Decatur Boulevard (N-76357) – Grand Teton Drive (N-83310) – Aliante Parkway (N-76357) Additional new road construction would be considered on a case-by-case basis	New road alignments: – Decatur Boulevard (N-76357) – Grand Teton Drive (N-83310) – Aliante Parkway (N-76357) Additional new road construction would be considered on a case-by-case basis; up to 6 ROW corridors across the northwestern portion of the CTA are assumed	New road alignments: – Decatur Boulevard (N-76357) – Grand Teton Drive (N-83310) – Aliante Parkway (N-76357) Additional new road construction would be considered on a case-by-case basis; up to 9 ROW corridors across the northwestern portion of the CTA are assumed	New road alignments: – Decatur Boulevard (N-76357) – Grand Teton Drive (N-83310) – Aliante Parkway (N-76357) Additional new road construction would be considered on a case-by-case basis; up to 5 ROW corridors across the northwestern portion of the CTA are assumed	New road alignments: – Decatur Boulevard (N-76357) – Grand Teton Drive (N-83310) – Aliante Parkway (N-76357) Consider additional corridor ROWs on a case-by-case basis
R&PP Act Leases	Floyd Lamb plan of development implemented, including trails and equestrian facilities (N-36876-01, N-62830)	Floyd Lamb plan of development implemented, including trails and equestrian facilities (N-36876-01, N-62830)	Floyd Lamb plan of development implemented, including trails and equestrian facilities (N-36876-01, N-62830)	Floyd Lamb plan of development implemented, including trails and equestrian facilities (N-36876-01, N-62830) McCool Regional Park in CTA and developed as a community park (N-49747-01)	Floyd Lamb and McCool Parks outside CTA, but lease lands developed as per plan of development (N-36876-01, N-62830) (N-49747-01)	Floyd Lamb plan of development implemented, including trails and equestrian facilities (N-36876-01, N-62830) McCool Regional Park in CTA and developed as a community park (N-49747-01)
Eglington Preserve (acres)	Within CTA; managed by Conservation Agreement	Within CTA; managed by Conservation Agreement	Within CTA; managed by Conservation Agreement	Outside CTA but managed by Conservation Agreement	Outside CTA but managed by Conservation Agreement	Within CTA; managed by Conservation Agreement
Tule Springs (acres)	Outside CTA: managed under the 1966 NHPA	Outside CTA: managed under the 1966 NHPA	Outside CTA: managed under the 1966 NHPA	Within CTA: managed under the 1966 NHPA	Within CTA: managed under the 1966 NHPA	Within CTA; managed under the 1966 NHPA

4.8.4 Alternative A

Direct and Indirect Impacts

Under Alternative A, 12,952.5 acres of the study area would be managed as the CTA, an increase of 7,952.5 acres (159%) over the original CTA boundary (see Table 2.4-1). Management emphasis would focus on preservation of sensitive resources values and the functioning of the ULVW.

Under this alternative, 370.8 acres would be available for disposal. The lands that would be offered for disposal include lands at McCool Regional Park (N-49747-01) and the Grand Teton electrical substation (N-76305).

Management of 12,952.5 acres as the CTA would be consistent with uses prescribed in the Las Vegas RMP and the LVVDB FEIS. Further, disposal of public lands for community growth and development would be consistent with the SNPLMA, as amended by Clark County Act. Because management of lands for conservation purposes and disposal for community development would be consistent with BLM management plans and legislation, impacts to land uses would not be significant.

Mitigation Measures and Unavoidable Adverse Impacts

No specific mitigation measures have been identified at this time to reduce impacts to land uses under this alternative, either within or outside the CTA. Mitigation measures will be identified when site-specific environmental analyses are prepared prior to implementation of specific actions. With implementation of specific actions and application of mitigation, lands in the CTA would continue to be managed to preserve sensitive resource values, ensure the functioning of the ULVW, and provide opportunities for recreation, education, and research. Outside the CTA, lands made available for disposal would continue to be used for urban development and the growth of the Cities of Las Vegas and North Las Vegas.

4.8.5 Alternative B (BLM Preferred Alternative)

Direct and Indirect Impacts

Under this alternative, 10,495.6 acres of the study area would be managed as the CTA, an increase of 5,495.6 acres (109%) over the original CTA boundary (see Table 2.4-1).

Under Alternative B, 2,827.5 acres of the study area would be available for disposal and private development for the growth of the Cities of Las Vegas and North Las Vegas.

Management of 10,495.6 acres as the CTA would be consistent with the Las Vegas RMP and the LVVDB FEIS. Disposal of 2,827.5 acres of public lands for the growth of the adjacent communities would also be consistent with the BLM land use plan and the LVVDB FEIS. Disposal of public lands for community growth and development would also be consistent with the SNPLMA, as amended by the Clark County Act. Because management of lands for conservation purposes and disposal of lands for community growth and development would be consistent with BLM land use plans and legislation, impacts to land uses would not be significant.

Mitigation Measures and Unavoidable Adverse Impacts

No specific mitigation measures are proposed. The unavoidable adverse impacts of this alternative would be the same as those described under Alternative A.

4.8.6 Alternative C

Direct and Indirect Impacts

Under Alternative C, 6,362.3 acres of the study area would be managed as the CTA, an increase of 1,362.3 acres (27%) over the original CTA boundary (see Table 2.4-1).

Under this alternative, 6,961.0 acres of land would be available for disposal and private development for the growth of the Cities of Las Vegas and North Las Vegas. The lands available for disposal would be the same as those described under Alternative B and would include lands between the CTA and DNWR north of Moccasin Road and lands between the CTA and DNWR north of Grand Teton Drive.

Management of 6,362.3 acres as the CTA would be consistent with uses prescribed in the Las Vegas RMP and the LVVDB FEIS. Disposal of 6,961.0 acres of public lands for the growth of the adjacent communities would also be consistent with the BLM land use plan and the LVVDB FEIS. Disposal of public lands for community growth and development would also be consistent with the SNPLMA, as amended by Clark County Act. Because management of lands for conservation purposes and disposal of lands for community development would be consistent with BLM land use plans and legislation, impacts to land uses would not be significant.

Mitigation Measures and Unavoidable Adverse Impacts

No specific mitigation measures are proposed. The unavoidable adverse impacts of this alternative would be the same as those described under Alternative A.

4.8.7 Alternative D

Direct and Indirect Impacts

Under this alternative, 5,301.4 acres of the CTA study area would be managed as the CTA, an increase of 301.4 acres (6%) over the original CTA boundary (see Table 2.4-1).

Under this alternative 8,022.7 acres of land would be available for disposal and private development for the growth of the Cities of Las Vegas and North Las Vegas. The lands available for disposal would be the same as those described under Alternative C, except that the lands at McCool Regional Park (N-49747-01) and the Grand Teton substation (N-76305) would remain in the CTA.

Management of 5,301.4 acres as the CTA would be consistent with the uses prescribed in the Las Vegas RMP and the LVVDB FEIS. Disposal of 8,022.7 acres of public lands for the growth of the adjacent communities would also be consistent with the BLM land use plan and the LVVDB FEIS. Disposal of public lands for community growth and development would also be consistent with the SNPLMA, as amended by the Clark County Act. Because management of lands for conservation purposes and disposal of lands for community development would be consistent with BLM management plans and legislation, impacts to land uses would not be significant.

Mitigation Measures and Unavoidable Adverse Impacts

No specific mitigation measures are proposed. The unavoidable adverse impacts of this alternative would be the same as those described under Alternative A.

4.8.8 Alternative E

Direct and Indirect Impacts

Under Alternative E, 3,313.8 acres of the study area would be managed as the CTA, a decrease of 1,686.2 acres (34%) from the original CTA boundary (see Table 2.4-1).
Under this alternative, 10,010.3 acres of land would be available for disposal and private development for the growth of the Cities of Las Vegas and North Las Vegas. The lands available for disposal would be the same as those described under Alternative D.

Management of 3,313.8 acres as the CTA would be consistent with the uses prescribed in the Las Vegas RMP and the LVVDB FEIS. Disposal of 10,010.3 acres of public lands for the growth of the adjacent communities would also be consistent with the BLM land use plan and the LVVDB FEIS. Disposal of public lands for community growth and development would also be consistent with the SNPLMA, as amended by the Clark County Act. Because management of lands for conservation purposes and disposal of lands for community development would be consistent with BLM land use plans and legislation, impacts to land uses would not be significant.

Mitigation Measures and Unavoidable Adverse Impacts

No specific mitigation measures are proposed. The unavoidable adverse impacts of this alternative would be the same as those described under Alternative A.

4.8.9 No-Action Alternative

Direct and Indirect Impacts

Under the No-Action Alternative, 1,448.2 acres of the study area would be managed as the CTA, a decrease of 3,551.8 acres (71%) from the original CTA boundary (see Table 2.4-1), including public lands in Tule Springs and Eglington Preserve. Generally, the CTA would remain undeveloped, although some development would be constructed on the boundary that would be apparent on the land.

Under this alternative, 12,174.5 acres of land would be available for disposal and private development for the growth of the Cities of Las Vegas and North Las Vegas. All lands in the study area would be available for disposal except lands in Tule Springs and Eglington Preserve.

Management of 1,448.2 acres as the CTA would be consistent with uses prescribed in the Las Vegas RMP and the LVVDB FEIS. Disposal of 12,174.5 acres of public lands for the growth of the adjacent communities would also be consistent with the BLM land use plan and the LVVDB FEIS. Disposal of public lands for community growth and development would also be consistent with the SNPLMA, as amended by the Clark County Act. Because management of lands for conservation purposes and disposal of lands for community development would be consistent with BLM land use plans and legislation, impacts to land uses would not be significant.

Mitigation Measures and Unavoidable Adverse Impacts

No specific mitigation measures are proposed. The unavoidable adverse impacts of this alternative would be the same as those described under Alternative A.

4.9 RECREATION

BLM lands within the CTA study area currently offer a wide variety of casual, dispersed recreation uses, including hiking, biking, horseback riding, wildlife viewing, and picnicking. Unauthorized OHV use and target shooting are also common, which contributes to the destruction of sensitive resources. For the purposes of this SEIS, impacts to recreation are considered significant if implementation of an action would substantially reduce or eliminate lands available for authorized recreation uses.

4.9.1 Alternative A

Under Alternative A, the CTA would encompass 12,952.5 acres. A total of 370.8 acres would be available for private development. Under this alternative, maximum protection of resources would take place.

Direct and Indirect Impacts

Public access to existing trails, washes, and roads for recreation use would be limited under this alternative. The loss of access may be perceived as negative to those users who access BLM parcels for entry into nearby recreation areas. The restriction of illegal OHV use would provide a safer, cleaner, and more welcoming environment for those who enjoy passive recreation uses, such as sightseeing and hiking.

Mitigation Measures and Unavoidable Adverse Impacts

Under Alternative A, no unavoidable adverse impact would occur to authorized recreation uses. No mitigation measures have been proposed to lessen impacts to recreation under this alternative.

4.9.2 Alternative B (BLM Preferred Alternative)

Under Alternative B, the CTA would comprise 10,495.6 acres. A total of 2,827.5 acres would be available for disposal.

Direct and Indirect Impacts

A direct, beneficial impact to recreationists would occur under this alternative as a result of the potential for increased access within the boundaries of the CTA.

Direct and indirect impacts of this alternative to recreation uses and users would be similar to those described under Alternative A.

Mitigation Measures and Unavoidable Adverse Impacts

Under Alternative B, no unavoidable adverse impacts would occur to authorized recreation uses. No mitigation measures have been proposed to lessen impacts to recreation under this alternative.

4.9.3 Alternative C

Under Alternative C, the CTA would encompass 6,362.3 acres. A total of 6,961.0 acres would be available for disposal.

Direct and Indirect Impacts

Direct, adverse impacts to passive recreation opportunities within the CTA would occur as a result of the sizable increase in development within its boundaries. Recreationists, such as mountain bikers, hikers, and equestrian users, may experience direct, adverse impacts under this alternative, as the availability of some existing routes would decline. A direct, beneficial impact to less active recreationists would occur under this alternative because of the potential for increased road access to future trailheads within the boundaries of the CTA. A wider range of visitors would be able to enjoy more recreation opportunities as a result of new development.

Mitigation Measures and Unavoidable Adverse Impacts

Under Alternative C, no unavoidable adverse impacts would occur to authorized recreation uses. No mitigation measures have been proposed to lessen impacts to recreation for this alternative.

4.9.4 Alternative D

Under Alternative D, the CTA would encompass 5,301.4 acres, with a total of 8,022.7 acres available for disposal.

Direct and Indirect Impacts

Direct and indirect impacts of this alternative to recreation uses and users would be similar to those described under Alternative C. Passive recreation opportunities might not be present under Alternative D, as access to existing resources would be hampered by development of those areas. Direct, adverse impacts to recreationists who enjoy passive recreation uses within the CTA, such as hiking, biking, and equestrian uses, would occur as more new development is permitted within the CTA boundaries, contributing to a sizable increase in both vehicular and foot traffic within its boundaries.
A reduction in pristine viewsheds would contribute to a direct, adverse impact for recreationists who wish to enjoy a natural setting.

Mitigation Measures and Unavoidable Adverse Impacts

Under Alternative D, an unavoidable adverse impact to recreationists would occur as a result of a decrease in available lands for both active and passive recreation uses. The reduction in pristine viewsheds as a result of new development within the CTA and substantial private development adjacent to the CTA would also contribute to unavoidable adverse impacts to recreation uses within the CTA. Urban park recreation opportunities that would be developed associated with new developments would be located outside the CTA boundary, as required by the land use plans of the cities. Additionally, because of the proximity to the DNWR and the requirements of cities' land use plans to include parks as part of all new development, there would be no substantial loss of lands available for recreation uses.

4.9.5 Alternative E

Under Alternative E, the CTA would encompass 3,313.8 acres, with a total of 10,010.3 acres available for private development. An emphasis on private development with mitigated infrastructure development within the CTA boundaries would be the cities' primary objective.

Direct and Indirect Impacts

Direct and indirect impacts of this alternative to recreation uses and users would be similar to those described under Alternative D. Sufficient passive recreation opportunities might not be present under Alternative E, as access to existing resources would increasingly be hampered by development of those areas. The loss of the natural landscape would constitute a direct, adverse impact for recreationists wishing to enjoy a natural setting.

Mitigation Measures and Unavoidable Adverse Impacts

Unavoidable adverse impacts to recreation uses would be similar to those under Alternative D. Urban park recreation opportunities that would be developed associated with new developments would be located outside the CTA boundary, as required by the land use plans of the cities. Additionally, because of the proximity to the DNWR and the requirements of cities' land use plans to include parks as part of all new development, there would be no substantial loss of lands available for recreation uses.

4.9.6 No-Action Alternative

Under the No-Action Alternative, the entire CTA, with the exception of the 1,448.2 acres that form Eglington Preserve and Tule Springs, would be available for disposal. The BLM would continue to manage the remaining 12,174.5 acres until disposal. Recreation would be limited to R&PP Act leased lands within the CTA.

Direct and Indirect Impacts

Under the No-Action Alternative, BLM lands within the CTA would remain open for dispersed recreation uses. However, more than 12,000 acres within the CTA study area boundaries would be eligible for disposal and, ultimately, development. This would result in an adverse impact to both passive and active recreation users, who would experience a decline in available recreation resources. The loss of the natural landscape would also contribute to a direct, adverse impact to recreationists who enjoy natural settings.

Mitigation Measures and Unavoidable Adverse Impacts

Under the No-Action Alternative, unavoidable adverse impacts to both passive and active recreation uses would occur as development encroaches on existing open recreation opportunities. A significant reduction in pristine viewsheds would also contribute to a direct, adverse impact to recreation users who wish to enjoy a more natural setting. Urban park recreation opportunities that would be developed associated with new developments would be located outside the CTA boundary, as required by the land use plans of the cities. Additionally, because of the proximity to the DNWR and the requirements of cities' land use plans to include parks as part of all new development, there would be no substantial loss of lands available for recreation uses.

4.10 TRANSPORTATION

Transportation and traffic continue to be issues across the LVV as new development occurs and the population continues to grow. This section discusses the potential impacts associated with the six different alternatives as they affect transportation and traffic in the LVV within and adjacent to the CTA study area. Each alternative considers different boundaries for the CTA. No management goals and

objectives were identified by the LVVDB ROD for transportation specific issues in the CTA study area. Table 4.10-1 provides transportation impacts from each alternative.

4.10.1 Analysis Approach and Assumptions

Because no traffic models were prepared for this analysis, to the extent possible, impacts to transportation and traffic are quantified on the basis of potential development and population growth in the vicinity of the CTA study area. Different alternative boundaries would result in varying amounts of land available for private development. All potential actions considered in the CTA study area would be subject to further site-specific analysis, including an analysis of potential impacts to travel and transportation. Potential population increases in and around the CTA are based on density scenarios provided by the City of Las Vegas, as summarized in the socioeconomics section (see Section 4.13.1, "Analysis Approach and Assumptions").

Table 4.10-1. Comparison of Transportation Impacts, by Alternative

Resource	A	B (Preferred)	C	D	E	No Action
Alternative Boundary (acres)	12,952.5	10,495.6	6,362.3	5,301.4	3,313.8	1,448.2
Potential Increase in Population (% of current)	0%	7%	22%	25%	31%*	38%*
Assumed Roads†	3	5	10	13	9	TBD

Note: TBD = to be determined.

* Potentially significant increase in traffic volume.

† Assumed roads are based on areas of private development associated with each alternative boundary and proposed roadway network information provided by the Cities of Las Vegas and North Las Vegas in the Northwest Consensus Map.

4.10.2 Impact Thresholds

In a 2005 study, TTI concluded that significant changes in traffic resulted in 53 urban areas in which traffic growth was 30% greater or more than increases in road capacity (TTI 2005). Between 1982 and 2003, there was a consistent correlation across U.S. cities between population growth and increased traffic volume (TTI 2005). Although growth has slowed down, it has not stopped, and the RTC projects that future developments are likely to facilitate additional growth in the future (RTC 2008). In the long term, recent population forecasts indicate that by 2030, the LVV will support a population almost double its current size. This growth will result in an increased traffic volume on LVV roadways (RTC 2008). The vehicle-to-capacity ratio is used to identify high traffic congestion. When the vehicle-to-capacity ratio of a roadway is greater than one, the road is carrying more than it was designed to carry (Draft Travel Demand Modeling for CTA Alternatives). Ratios greater than one can lead to significant impacts to transportation and traffic.

4.10.3 Alternative A

Actions Proposed under Alternative A that Would Cause Change to Existing Transportation Resources

Alternative A would involve the preservation of 12,952.5 acres. Under this alternative, sensitive resources within the CTA would be preserved, and the natural ecology of the ULVW would be ensured. Improvements to existing roads within and adjacent to the area would occur.

Direct and Indirect Impacts

VEHICLE TRAFFIC

Adverse impacts to vehicle traffic would be minor and long term. Direct impacts would include minor increases in traffic on roadways within and near the CTA study area. Minor increases in average daily traffic may result from increased visitation. Additional increases in daily traffic volume resulting from population growth would be minor because only minimal lands in the CTA study area would be made available for disposal.

ACCESS

Impacts to access are based on the number of potential trails, streets, roads, and freeways that would intersect with the CTA study area. More road and trail construction within and adjacent to the CTA would lead to greater access. The majority of the CTA study area is currently not accessible by an existing transportation network. Improved access to the Clark County Shooting Park would result from construction activities. Because lands north of the wash would not be available for private development under Alternative A, transportation access across the ULVW would remain at current conditions.

Mitigation Measures and Unavoidable Adverse Impacts

Because of the nature of the actions considered and the description of potential impacts to transportation, no mitigation measures are recommended or required. Impacts include minor to moderate increases in traffic density as a result of projected population increases in the LVV. Unavoidable adverse impacts to transportation would result from traffic increases associated with potential increases in visitation to the CTA, as well as with population growth in the LVV.

4.10.4 Alternative B (BLM Preferred Alternative)

Actions Proposed under the Preferred Alternative that Would Cause Change to Existing Transportation Resources

The Preferred Alternative would involve the preservation of 10,495.6 acres as the CTA. Under this alternative, greater opportunities for primitive and non-motorized recreation opportunities, education, and research opportunities would be available, and the addition of any new infrastructure, including transportation development, would provide access for those additional opportunities.

Direct and Indirect Impacts

VEHICLE TRAFFIC

Population increases associated with private development that is assumed to occur under this alternative would result in long-term, adverse impacts to transportation as a result of moderate increases in the daily traffic on existing freeways. The level of private development that is assumed would occur would result in a potential population increase of up to 56,118 residents. This would be a 7% increase from the 2006 estimated population (778,356) of the Cities of Las Vegas and North Las Vegas, with a moderate increase in arterial roadway capacity. The impacts to transportation from an increase in traffic volume associated with a 7% increase in population would lead to increased traffic congestion but would not, however, exceed the threshold of significance.

Construction activities associated with potential private development would include movement of personnel and materials on existing roadways. These activities have the potential to result in indirect, adverse impacts in the short term to current traffic levels in the CTA study area. These impacts would be minor because of the limited allowable development under this alternative.

ACCESS

Indirect, adverse impacts to access would be moderate and would result from the potential increased private development. Impacts would include a short-term disruption of access to businesses and residences adjacent to the CTA study area. Additionally, lands available for private development would be bounded by the CTA to the north and east and by the Paiute Reservation to the west. The only existing road access available to the new potential private development would be Moccasin Road to the south and Fort Apache Road to the north. There would be a need for additional access to potential private development on these lands.

Mitigation Measures and Unavoidable Adverse Impacts

BMPs for traffic control would be implemented to minimize the level of impacts from construction projects associated with private development. Prior to any construction taking place, builders should consult with the NDOT and RTC to develop traffic control plans. Unavoidable adverse impacts to transportation would result from a 7% increase in population and corresponding increase in traffic density. Additionally, short-term disruptions and delays in vehicle access would result from the potential for increased development on 2,827.5 acres in areas adjacent to the alternative boundary.

4.10.5 Alternative C

Actions Proposed under Alternative C that Would Cause Change to Existing Transportation Resources

Alternative C would involve the preservation of 6,362.3 acres. Under this alternative, emphasis would be placed on providing opportunities for recreation, infrastructure, and private development outside the CTA while continuing to meet the resource conservation purpose and need of the SEIS.

Direct and Indirect Impacts

VEHICLE TRAFFIC

The population increases associated with private development that is assumed to occur would result in long-term adverse impacts to transportation from moderate increases in the daily traffic on existing freeways. Under Alternative C, some private development is assumed to occur within the CTA study area on approximately 6,960.9 acres, resulting in a potential population increase of up to 169,150 residents. This would be a 22% increase from the 2006 estimated population (778,356) of the Cities of Las Vegas and North Las Vegas, with increases in freeway capacity and arterial roadway capacity. The impacts to transportation from an increase in traffic volume associated with a 22% increase in population would not reach a level of significance. The additional road capacity that is assumed in this alternative would further reduce impacts to transportation and traffic.

Impacts from construction activities associated with potential private development would include movement of personnel and materials on existing roadways. These activities have the potential to result in

indirect, adverse impacts in the short term to current traffic levels in the CTA study area. Impacts would be minor because individual projects would occur over the long term across different locations.

ACCESS

Indirect, adverse impacts to access would be moderate and short term and would result from construction activities associated with potential increased private development. Impacts would include a short-term disruption in access to existing businesses and residences adjacent to the CTA study area.

Mitigation Measures and Unavoidable Adverse Impacts

Mitigation measures would be the same as those under Alternative B. Unavoidable adverse impacts include increases in traffic density associated with a 22% increase in population and short-term disruptions and delays in vehicle access. Traffic disruptions and delays associated with potential private development could occur at various locations throughout the disposed 6,960.9 acres adjacent to the alternative boundary.

4.10.6 Alternative D

Actions Proposed under Alternative D that Would Cause Change to Existing Transportation Resources

Alternative D would involve the preservation of 5,301.4 acres. Under this alternative, up to 8,022.7 acres of private development would potentially occur outside the CTA boundary, and sensitive resources within the CTA would continue to be protected.

Direct and Indirect Impacts

VEHICLE TRAFFIC

There would be moderate adverse impacts to vehicle traffic under Alternative D. Under Alternative D, some private development is assumed to occur within the CTA study area on approximately 8,022.7 acres, resulting in a potential population increase of up to 194,952 residents. This would be a 25% increase from the 2006 estimated population (778,356) of the Cities of Las Vegas and North Las Vegas, with increases in freeway capacity and arterial roadway capacity. The impacts to transportation from increases in traffic volume associated with a 25% increase in population would not reach a level of significance. The additional road capacity assumed under this alternative would further reduce impacts to transportation and traffic.

Impacts from construction activities associated with potential private development would be the same as those under Alternative C.

ACCESS

The potential private development north of the ULVW that would occur under Alternative C would require multiple points of access across the ULVW within the CTA Alternative D boundary. Additionally, the public would have greater access to recreation opportunities within the CTA from the potential development.

Mitigation Measures and Unavoidable Adverse Impacts

Mitigation measures would be the same as those under Alternative B. Unavoidable adverse impacts would include increases in traffic density associated with a 25% increase in population and short-term disruptions and delays in vehicle access. Traffic disruptions and delays associated with potential private development could occur at various locations throughout the disposed 8,022.7 acres adjacent to the alternative boundary.

4.10.7 Alternative E

Actions Proposed under Alternative E that Would Cause Change to Existing Transportation Resources

Alternative E would involve the preservation of 3,313.8 acres. Under this alternative, emphasis would be placed on lands being made available for disposal for private development, allowing infrastructure with mitigation within the CTA in support of private development and management for sensitive resources within the CTA.

Direct and Indirect Impacts

VEHICLE TRAFFIC

There would be adverse impacts to vehicle traffic under Alternative E. Under Alternative E, private development is assumed to occur within the CTA study area on approximately 10,010.3 acres, resulting in a potential population increase of up to 243,250 residents. This would be a 31% increase from the 2006 estimated population (778,356) of the Cities of Las Vegas and North Las Vegas, with increases in freeway capacity and arterial roadway capacity. The impacts to transportation from increases in traffic volume associated with a 31% increase in population would reach a level of significance. However, the additional road capacity assumed under this alternative would reduce potential impacts to a level that is less than significant.

Impacts from construction activities associated with potential private development would be the same as those under Alternative C.

ACCESS

Impacts to access would be the same as those under Alternative D.

Mitigation Measures and Unavoidable Adverse Impacts

Unavoidable adverse impacts include significant increases in traffic volume as a result of population increases in the LVV. Additionally, traffic disruptions and delays associated with potential private development could occur at locations throughout the disposed 10,010.3 acres adjacent to the alternative boundary. These impacts would be mitigated in the long term through implementation of elements of the RTC transportation plan, including additional road capacity, roadway improvements, congestion management programs, expanded transit options, and alternative forms of transportation, such as pedestrian and bicycle (RTC 2008).

4.10.8 No-Action Alternative

Actions Proposed under the No-Action Alternative that Would Cause Change to Existing Transportation Resources

Under the No-Action Alternative, the entire CTA, except approximately 1,448.2 acres (Eglington Preserve and Tule Springs), would be available for disposal in accordance with the SNPLMA, FLPMA, other applicable laws subject to valid existing rights, and stipulations established by the conservation agreement. All infrastructure, including roads and recreational trails, agreed to in the Conservation Agreement would continue to be allowed in the CTA.

Direct and Indirect Impacts

VEHICLE TRAFFIC

There would be adverse impacts to vehicle traffic under the No-Action Alternative. Under the No-Action Alternative, private development would be assumed to occur within the CTA study area on approximately 12,174.5 acres, resulting in a potential population increase of up to 295,245 residents. This would be a 38% increase from the 2006 estimated population (778,356) of the Cities of Las Vegas and North Las Vegas, with increases in freeway capacity and arterial roadway capacity. The impacts to transportation from increases in traffic volume associated with a 38% increase in population would potentially lead to vehicle-to-capacity ratios greater than one on roadways in the area, reaching a level of significance.

ACCESS

Impacts to access would be the same as those under Alternative E.

Mitigation Measures and Unavoidable Adverse Impacts

Mitigation measures and unavoidable adverse impacts are the same as those under Alternative E.

4.11 NOISE

This section discusses the potential impacts to sensitive noise receptors in the vicinity of the CTA study area. Sensitive noise receptors include residences, hospitals, libraries, recreation areas, churches, and similar locations. Six different alternatives are analyzed in this section, and each alternative presents varying degrees of impacts to noise receptors within the vicinity of the CTA study area. Each alternative considers different CTA boundaries.

4.11.1 Analysis Approach and Assumptions

The criteria used to assess impacts to sensitive noise receptors are defined by the noise ordinances of the Cities of Las Vegas and North Las Vegas, as well as Clark County Zoning Development Code 30.68.020, which sets maximum allowable noise levels in dB. Because the potential impacts would be the same for the City of Las Vegas and the City of North Las Vegas, the impacts to the two cities are discussed collectively.

4.11.2 Impact Thresholds

Noise is regulated by the City of Las Vegas, City of North Las Vegas, and Clark County in the CTA study area. According to city noise ordinances, any excessive, unreasonably loud noise that occurs between the hours of 11:00 pm and 7:00 am is considered a significant impact. None of the alternatives would allow actions that would exceed this significance criterion.

According to county regulations, any long-term, sustained increase in ambient noise levels above the maximum permitted sound level as defined by Clark County is considered a significant impact to sensitive noise receptors. Impulsive noise levels within residential districts cannot exceed 56 dB during the daytime and 46 dB during the nighttime. Within business and industrial districts, impulsive noise levels cannot exceed 65 dB during the daytime and 61 dB during the nighttime. There is an exception for construction activities: county code permits construction activities to exceed these noise levels when conducted during the daytime. Any permitted construction activities that occur during the daytime would not result in a significant impact to sensitive noise receptors. Allowable persistent noise levels vary, depending on proximity to residential, business, or industrial districts and the frequency of occurrence of the noise (see Table 3.11-1). All potential allowable actions considered for the CTA would be subject to further site-specific analysis prior to final approval.

4.11.3 Actions Proposed under all Alternatives that Would Cause Change to Ambient Noise Levels

Direct and Indirect Impacts

Direct, adverse impacts from construction activities would occur under all alternatives in the short term. Noise from general construction equipment for new development would potentially exceed maximum dB levels to any sensitive noise receptor within 1,000 feet (Table 4.11-1). Table 4.11-2 shows typical noise levels of common sounds. This temporary increase in ambient noise levels would impact lands to the south and west of the CTA, where residential areas occur immediately adjacent to Alternative A boundary. However, it is anticipated that construction activities would require minimal equipment use, would be confined to narrow corridors, would occur during daytime hours, and would occur only in the short term.

Table 4.11-1. Typical Construction Equipment Noise

Equipment	Noise Level (dB) 50 feet	Noise Level (dB) 500 feet	Noise Level (dB) 1,000 feet
Bulldozer	89	69	63
Crane	88	68	62
Dump truck	88	68	62
Tractor	80	60	54
Backhoe	85	65	59

Source: Federal Transit Administration (2006).

Table 4.11-2. Common Sound Levels

Common Sounds	Noise Level (dB)
Thunderclap	180
Auto horn (3 feet)	120
Garbage truck	100
Heavy truck (50 feet)	90
Alarm clock (2 feet)	80
Freeway traffic	70
Conversational speech	60
Light auto traffic (100 feet)	50
Quiet office	40
Threshold of hearing	0

Source: No Noise (2008).

4.11.4 Alternative A

Actions Proposed under Alternative A that Would Cause Change to Existing Ambient Noise Levels

Alternative A preserves a total of 12,952.5 acres. There would be 370.8 acres available for private development, including recreation facilities at McCool Regional Park.

Direct and Indirect Impacts

There would be no additional direct or indirect adverse impacts to sensitive noise receptors under Alternative A. Under this alternative, there would be no further change in ambient noise levels within or around the CTA boundary. This would have an indirect, beneficial impact to sensitive noise receptors by limiting development that might otherwise occur in the area.

Mitigation Measures and Unavoidable Adverse Impacts

Based on the nature of the actions considered and the description of potential impacts to sensitive noise receptors, no mitigation measures are recommended or required. BMPs for construction would be implemented to minimize the level of impacts from potential construction noise associated with future development actions. Impacts include minor short-term increases in ambient noise levels as a result of construction activities.

4.11.5 Alternative B (BLM Preferred Alternative)

Actions Proposed under the Preferred Alternative that Would Cause Change to Existing Ambient Noise Levels

The Preferred Alternative conserves a total of 10,495.6 acres. There would be 2,827.5 acres of land within the CTA study area available for disposal.

Direct and Indirect Impacts

Under this alternative, approximately 10,495.6 acres of land would be conserved. This would generally have a beneficial impact to sensitive noise receptors, as it would limit development that might otherwise occur on these lands. Within the 2,827.5 acres available for private development, there would be the potential for minor increases in ambient noise levels in the CTA study area in both the short and long term.

Increases in ambient noise would result from increased construction activities in the short term. While these construction activities would exceed 85 dB, they would not occur at night or for sustained periods. Clark County code permits construction activities to exceed these noise standards when conducted during daytime hours. Therefore, the short-term, adverse impacts to sensitive noise receptors from construction activities would occur but would not reach a level of significance.

Increases in ambient noise would result from the potential development of new residential suburban areas and increased vehicle traffic on roadways in the long term. The increases in ambient noise levels associated with new residential developments and increased vehicle traffic would result in adverse impacts to sensitive noise receptors. It is assumed that increased ambient noise levels would be the same as those in similarly developed areas throughout the LVV and would not exceed maximum allowable noise levels set by Clark County. Additionally, potential impacts to sensitive noise receptors from future actions would be determined and mitigated as part of the site-specific planning process for any future approved developments. Therefore, long-term, adverse impacts to sensitive noise receptors from new private development and increased vehicle traffic would not reach a level of significance.

Mitigation Measures and Unavoidable Adverse Impacts

Based on the nature of the actions considered and the description of potential impacts to sensitive noise receptors, no mitigation measures are recommended or required. BMPs for construction would be implemented to minimize the level of impacts from potential construction noise associated with future development actions. Impacts include minor short-term increases in ambient noise levels as a result of construction activities.

4.11.6 Alternative C

Action Proposed under Alternative C that Would Cause Change to Existing Ambient Noise Levels

Alternative C conserves a total of 6,362.3 acres. There would be 6,961.0 acres of land within the CTA study area available for disposal and potential private development.

Direct and Indirect Impacts

Under this alternative, approximately 6,362.3 acres of land would be conserved. This would generally have a beneficial impact to sensitive noise receptors, as it would limit development that might otherwise occur on these lands. Within the 6,961.0 acres available for private development, there would be the potential for increases in ambient noise levels in the CTA study area in both the short and long term. Additionally, direct, adverse impacts from construction activities in the CTA would occur in the short term. Noise from general construction equipment would potentially exceed maximum dB levels to any sensitive noise receptor within 1,000 feet (see Table 4.11-1). This temporary increase in ambient noise levels would impact lands to the south and west of the CTA, where residential areas occur immediately

adjacent to the CTA. Noise from allowable construction activities within and adjacent to the CTA would not occur at night or for sustained periods and would be consistent with the County Zoning Development Code. The long-term increases in ambient noise levels associated with new private development would result in adverse impacts to sensitive noise receptors. It is assumed that ambient noise would be the same as that in similarly developed areas in LVV and would not exceed the county's maximum allowable noise levels. Additionally, potential impacts to sensitive noise receptors from future actions would be determined and mitigated as part of the site-specific planning process for any future approved developments. Therefore, adverse impacts to sensitive noise receptors from construction activities and private development would not reach a level of significance.

Adverse impacts would result from the potential new development. Construction activities would lead to short-term increases in the current ambient noise level in the CTA. Noise related to construction would not occur at night or for sustained periods.

Mitigation Measures and Unavoidable Adverse Impacts

BMPs would be implemented to minimize potential impacts to sensitive noise receptors during design and construction of all potential new development. Unavoidable adverse impacts include short-term increases in ambient noise levels as a result of construction activities.

4.11.7 Alternative D

Actions Proposed under Alternative D that Would Cause Change to Existing Ambient Noise Levels

Alternative D would cover a total of 5,301.4 acres. There would be 8,022.7 acres of land within the CTA study area available for disposal and potential private development.

Direct and Indirect Impacts

Under this alternative, approximately 5,301.4 acres of land would be conserved. This would generally have a beneficial impact to sensitive noise receptors as it would limit development that might otherwise occur on these lands. In the 8,022.1 acres available for private development, there would be the potential for increases in ambient noise levels in the CTA study area in both the short and long term. Impacts to sensitive noise receptors would be the same as described under Alternative C.

There would be no additional direct impacts to sensitive noise receptors under Alternative D. Indirect, adverse impacts from potential road development would be the same as those under Alternative C.

Mitigation Measures and Unavoidable Adverse Impacts

Mitigation measures would be the same as those under Alternative C. Unavoidable adverse impacts would be the same as those described under Alternative C and include short-term increases in ambient noise levels.

4.11.8 Alternative E

Actions Proposed under Alternative E that Would Cause Change the Existing Ambient Noise Levels

Alternative E would cover a total of 3,313.8 acres. There would be 10,010.3 acres of land within the CTA study area available for disposal and potential private development.

Direct and Indirect Impacts

Under this alternative, approximately 3,313.8 acres of land would be conserved. This would generally have a beneficial impact to sensitive noise receptors as it would limit development that might otherwise occur on these lands. In the 10,010.3 acres available for private development, there would be the potential for minor increases in ambient noise levels in the CTA study area in both the short and long term. Impacts to sensitive noise receptors would be the same as those described under Alternative C.

There would be no additional direct impacts to sensitive noise receptors under Alternative E. Indirect, adverse impacts from potential road development would be the same as those under Alternative C.

Mitigation Measures and Unavoidable Adverse Impacts

Mitigation measures would be the same as those under Alternative C. Unavoidable adverse impacts would be the same as those described under Alternative C and include short-term increases in ambient noise levels from construction activities.

4.11.9 No-Action Alternative

Actions Proposed under the No-Action Alternative that Would Cause Change the Existing Ambient Noise Levels

Under the No-Action Alternative, the entire CTA, except approximately 1,448.2 acres (Eglington Preserve and Tule Springs), would be available for disposal in accordance with the SNPLMA, FLPMA, other applicable laws subject to valid existing rights, and in accordance with stipulations established by the Conservation Agreement.

Direct and Indirect Impacts

Under this alternative, approximately 1,448.2 acres of land would be conserved. In the 12,174.5 acres available for private development, there would be the potential for minor increases in ambient noise levels in the CTA study area in both the short and long term. Impacts to sensitive noise receptors would be the same as those described under Alternative C.

There would be no additional direct impacts to sensitive noise receptors under the No-Action Alternative. Indirect, adverse impacts from new development would be the same as those under Alternative C.

Mitigation Measures and Unavoidable Adverse Impacts

Mitigation measures and unavoidable adverse impacts would be the same as those under Alternative C.

4.12 HAZARDOUS MATERIALS

This section analyzes the potential direct, indirect, and cumulative impacts associated with hazardous materials under each of the alternatives. Table 2.4-1 provides a comparison of the original CTA boundary proposed in the LVVDB FEIS and the acreage available for disposal under each of the SEIS alternatives.

4.12.1 Analysis Approach and Assumptions

To identify potential impacts associated with hazardous materials, a supplemental records review and site reconnaissance was conducted within the limits of the CTA study area for the current analysis. The supplemental data serve as an update to the modified Phase I Environmental Site Assessment conducted for the LVVDB FEIS (BLM 2004a).

Assumptions used in identifying hazardous materials within the CTA include the following:

- Federal, state, and local environmental databases were reviewed using the minimum search distances outlined in the American Society for Testing and Materials standards.
- The site reconnaissance conducted for the current analysis was a general and cursory one using existing roadways. It is assumed that BLM will conduct a complete Phase I Environmental Site Assessment on parcels available for disposal prior to lease or sale of the land.

4.12.2 Impact Thresholds

The LVVDB FEIS previously defined significance thresholds for evaluating impacts associated with the presence of hazardous materials on lands available for disposal and subsequent development. The thresholds remain applicable for the current CTA analysis. A hazardous materials impact would be considered significant if

- There is an increased potential for exposure to hazardous materials;
- The type and/or quantity of a hazardous material on a given parcel prevents the disposal of or requires remediation to those lands; or
- There is an environmental or health threat to human or animal populations.

4.12.3 Actions Proposed under All Alternatives that Would Cause Change Associated with Hazardous Materials

The following action would be implemented under all alternatives and would cause change associated with hazardous materials:

- BLM would inventory unauthorized surface disturbances in the CTA, including illegal dump sites, user-created trails and tracks, and other trespasses, and would seek to rehabilitate these disturbances to a more natural condition to improve management and protection of sensitive resources.

Direct and Indirect Impacts

The modified Phase I Environmental Site Assessment conducted for the LVVDB FEIS identified one REC along the eastern boundary of the CTA study area. The REC is described as two steel pipes

protruding from the ground and could be associated with USTs or other historical uses involving hazardous materials. In addition, the CTA also has a history of mining and unauthorized dumping, which may have introduced hazardous materials into the study limits. The REC, mining locales, and dump sites could contain hazardous materials. This is a potentially adverse impact. Characterization and appropriate remediation of these areas are required in order to reduce the risk of exposure to hazardous materials. The REC, mining, and dump sites likely would be documented as part of BLM's inventory of unauthorized surface disturbances.

Ground-disturbing activities associated with construction activities have the potential to introduce hazardous materials into the CTA. Maintenance and operation of construction equipment could result in spills or releases of hazardous materials (such as oils, fuels, and lubricants) onto the ground. Local codes and regulatory processes include provisions for construction site operations to limit the potential for exposure to hazardous materials, including requirements such as preparing hazardous materials management plans and spill containment plans.

Mitigation Measures and Unavoidable Adverse Impacts

To address potential impacts associated with the REC and potential hazardous materials on lands slated for new development, BLM shall conduct an assessment of the areas to determine whether hazardous materials exist on the property. If such materials are found to be present, BLM shall conduct remediation activities prior to construction to remove the materials from the site.

Provided that the above mitigation measure is properly implemented, there would be no unavoidable adverse impacts involving hazardous materials under all alternatives.

4.12.4 Alternative A

Actions Proposed under Alternative A that Would Cause Change Associated with Hazardous Materials

In addition to those actions described above, the following action under Alternative A also would have impacts related to hazardous materials:

- A total of 370.8 acres would be available for disposal and subsequent development.

Direct and Indirect Impacts

One REC was identified along the eastern boundary of the CTA study area. Although no hazardous materials were identified at this location, the REC was identified as two steel pipes protruding from the ground. The nature of these pipes is unknown and could be associated with underground storage tanks or other historical uses that involve hazardous materials. The area that contains the steel pipes would not be developed under Alternative A. However, because the nature of this REC is currently unknown, additional investigation is required to assess the function of the steel pipes and any potential hazardous material impacts associated with the prior use of this area. Mitigation is required to address this potentially adverse impact.

Based on a history of mining and unauthorized dumping throughout the CTA study area, there is the potential for previously unknown hazardous materials to be located within the CTA boundaries. Mining and dump sites could contain hazardous materials. This is a potentially adverse impact. Characterization and appropriate remediation are required in order to ensure that any lands to be disposed of or leased by BLM do not include hazardous materials.

Construction activities have the potential to introduce hazardous materials into the CTA. Construction equipment and associated activities have the potential to spill or release hazardous materials (such as oils, fuels, and lubricants) onto the ground. Local codes and regulatory processes include provisions for construction site operations to limit the potential for exposure to hazardous materials, including requirements such as preparing hazardous materials management plans and spill containment plans. No further mitigation would be required.

Indirect impacts from hazardous materials may result from subsequent development of the disposed lands under Alternative A if that development involves the use of hazardous materials (for example, gasoline fueling stations or dry cleaners). The use of hazardous materials is locally regulated to prevent environmental impacts from hazardous materials that are stored or used as part of a business operation. Development activities conducted within the disposal boundary area would be required to comply with hazard mitigation requirements stated in the appropriate municipal development code. No additional mitigation is required.

Mitigation Measures and Unavoidable Adverse Impacts

To address potential impacts associated with the REC and potential hazardous materials on disposal lands, BLM shall conduct an assessment of the site to determine whether hazardous materials exist on the property. If such materials are found to be present, BLM shall conduct remediation activities to remove the materials from the site. These actions shall occur prior to disposal or leasing of this property.

Provided that the above mitigation measure is properly implemented, there would be no unavoidable adverse impacts involving hazardous materials under this alternative.

4.12.5 Alternative B (BLM Preferred Alternative)

Actions Proposed under the Preferred Alternative that Would Cause Change Associated with Hazardous Materials

In addition to the actions common to all alternatives, the following action under the Preferred Alternative also would have impacts related to hazardous materials:

- A total of 2,827.5 acres would be available for disposal and development, including areas north and east of the Paiute Reservation and areas adjacent to DNWR at the northeastern extent of the CTA study area.

Direct and Indirect Impacts

With implementation of this alternative, the direct and indirect impacts associated with hazardous materials would be similar to those described under Alternative A. Under the Preferred Alternative, there would be approximately 2,827.5 acres of land made available for disposal by BLM; thus, there would also be an increased potential for encountering hazardous materials during construction activities on disposal and lease parcels.

Because there would be more land available for disposal (and subsequent development) under this alternative, there would also be a greater potential for the introduction of hazardous materials through spills or other chemical releases associated with construction activities.

As described under Alternative A, some future land uses (such as gas stations and dry cleaning businesses) may require the use of hazardous materials. However, existing regulations provide an adequate framework for minimizing potential impacts. No mitigation measures are needed.

Mitigation Measures and Unavoidable Adverse Impacts

To address potential impacts associated with the REC and potential hazardous materials on disposal lands, BLM shall conduct an assessment of the site to determine whether hazardous materials exist on the property. If such materials are found to be present, BLM shall conduct remediation activities to remove the materials from the site. These actions shall occur prior to disposal or leasing of this property.

Provided that the above mitigation measure is properly implemented, there would be no unavoidable adverse impacts involving hazardous materials under this alternative.

4.12.6 Alternative C

Actions Proposed under Alternative C that Would Cause Change Associated with Hazardous Materials

In addition to the actions common to all alternatives, the following action under Alternative C also would have impacts related to hazardous materials:

- A total of 6,960.9 acres north and south of the CTA would be available for disposal, including areas north and east of the Paiute Reservation.

Direct and Indirect Impacts

With implementation of this alternative, the direct and indirect impacts associated with hazardous materials would be similar to those described above for Alternative A. Under Alternative C, there would be approximately 6,960.9 acres of land made available for disposal by BLM; thus, there would also be an increased potential for encountering hazardous materials during construction activities on disposal and lease parcels.

Because there would be more land available for disposal (and subsequent development) under this alternative, there is also a greater potential for the introduction of hazardous materials through spills or other chemical releases associated with construction activities.

As described under Alternative A, some future land uses (such as gas stations and dry cleaning businesses) may require the use of hazardous materials. However, existing regulations provide an adequate framework for minimizing potential impacts. No mitigation measures are needed.

Mitigation Measures and Unavoidable Adverse Impacts

To address potential impacts associated with the REC and potential hazardous materials on disposal lands, BLM shall conduct an assessment of the site to determine whether hazardous materials exist on the property. If such materials are found to be present, BLM shall conduct remediation activities to remove the materials from the site. These actions shall occur prior to disposal or leasing of this property.

Provided that the above mitigation measure is properly implemented, there would be no unavoidable adverse impacts involving hazardous materials under this alternative.

4.12.7 Alternative D

Actions Proposed under Alternative D that Would Cause Change Associated with Hazardous Materials

In addition to the actions common to all alternatives, the following action under Alternative D also would have impacts related to hazardous materials:

- A total of 8,022.7 acres would be available for disposal and future development, primarily north and east of the Paiute Reservation and along the northern extent of the CTA study area, adjacent to the DNWR.

Direct and Indirect Impacts

With implementation of this alternative, the direct and indirect impacts associated with hazardous materials would be similar to those described above under Alternative A. Under Alternative D, there would be approximately 8,022.7 acres of land made available for disposal by BLM; thus, there would also be an increased potential for encountering hazardous materials during construction activities on disposal and lease parcels.

Because there would be more land available for disposal (and subsequent development) under this alternative, there is also a greater potential for the introduction of hazardous materials through spills or other chemical releases associated with construction activities.

As described under Alternative A, some future land uses (such as gas stations and dry cleaning businesses) may require the use of hazardous materials. However, existing regulations provide an adequate framework for minimizing potential impacts. No mitigation measures are needed.

Mitigation Measures and Unavoidable Adverse Impacts

To address potential impacts associated with the REC and potential hazardous materials on disposal lands, BLM shall conduct an assessment of the site to determine whether hazardous materials exist on the property. If such materials are found to be present, BLM shall conduct remediation activities to remove the materials from the site. These actions shall occur prior to disposal or leasing of this property.

Provided that the above mitigation measure is properly implemented, there would be no unavoidable adverse impacts involving hazardous materials under this alternative.

4.12.8 Alternative E

Actions Proposed under Alternative E that Would Cause Change Associated with Hazardous Materials

In addition to the actions common to all alternatives, the following action under Alternative E also would have impacts related to hazardous materials:

- A total of 10,010.3 acres would be available for disposal and future development.

Direct and Indirect Impacts

With implementation of this alternative, the direct and indirect impacts associated with hazardous materials would be similar to those described above under Alternative A. Under Alternative E, there would be approximately 10,010.3 acres of land made available for disposal by BLM; thus, there would also be an increased potential for encountering hazardous materials during construction activities on disposal and lease parcels.

Because there would be more land available for disposal (and subsequent development) under this alternative, there is also a greater potential for the introduction of hazardous materials through spills or other chemical releases associated with construction activities.

As described under Alternative A, some future land uses (such as gas stations and dry cleaning businesses) may require the use of hazardous materials. However, existing regulations provide an adequate framework for minimizing potential impacts. No mitigation measures are needed.

Mitigation Measures and Unavoidable Adverse Impacts

To address potential impacts associated with the REC and potential hazardous materials on disposal lands, BLM shall conduct an assessment of the site to determine whether hazardous materials exist on the property. If such materials are found to be present, BLM shall conduct remediation activities to remove the materials from the site. These actions shall occur prior to disposal or leasing of this property.

Provided that the above mitigation measure is properly implemented, there would be no unavoidable adverse impacts involving hazardous materials under this alternative.

4.12.9 No-Action Alternative

Actions Proposed under the No-Action Alternative that Would Cause Change Associated with Hazardous Materials

In addition to the actions common to all alternatives, the following action under the No-Action Alternative also would have impacts related to hazardous materials:

- With the exception of Eglington Preserve and Tule Springs, the remainder of the CTA study area, which amounts to 12,150 acres, would be available for disposal.

Direct and Indirect Impacts

Under the No-Action Alternative, a substantial amount of land will be made available for disposal and potential development within the CTA study area. With implementation of this alternative, the direct and indirect impacts associated with hazardous materials would be similar to those described above under Alternative A. Under the No-Action Alternative, there would be approximately 12,150 acres of land made available for disposal by BLM; thus, there would also be an increased potential for encountering hazardous materials during construction activities on disposal and lease parcels.

Because there would be more land available for disposal (and subsequent development) under this alternative, there is also a greater potential for the introduction of hazardous materials through spills or other chemical releases associated with construction activities.

As described under Alternative A, some future land uses (such as gas stations and dry cleaning businesses) may require the use of hazardous materials. However, existing regulations provide an adequate framework for minimizing potential impacts. No mitigation measures are needed.

Mitigation Measures and Unavoidable Adverse Impacts

To address potential impacts associated with the REC and potential hazardous materials to disposal lands, BLM shall conduct an assessment of the site to determine whether hazardous materials exist on the property. If such materials are found to be present, BLM shall conduct remediation activities to remove the materials from the site. These actions shall occur prior to disposal or leasing of this property.

Provided that the above mitigation measure is properly implemented, there would be no unavoidable adverse impacts involving hazardous materials under this alternative.

4.13 SOCIOECONOMICS

The preservation or development of currently undeveloped desert lands in the LVV would directly impact the social and economic resources of the area as a result of potential population increases, employment requirements, capital expenditures, loss or gain of open space as an amenity, and loss or gain of productive land value. The analysis of socioeconomics in the following section focuses on impacts to the Cities of Las Vegas and North Las Vegas, residents in the area, and, to a lesser extent, on Clark County, where data are not available for the cities themselves. Social impacts are often discussed qualitatively when quantitative data are not available to address these impacts. To the extent possible, economic impacts are quantified based on assumptions and estimates of tax revenue and potential for development density under the different alternatives.

4.13.1 Analysis Approach and Assumptions

Community Perceptions

Analyzing community perceptions, including those of stakeholders and affected groups, is necessarily grounded primarily in the assumption that alternatives seeking additional protection of the CTA study area are based on the protection of a social amenity. A social amenity can be parks, open space, and other recreation resources. Social amenities are difficult to quantify, as they are intrinsic values not typically measured in dollar values. Alternatives that seek to provide more development acreage or additional ROW to accommodate development are based on realization of development goals and potential, which may vary, depending on the perception of various groups and stakeholders. Development potential can include employment opportunities, tax revenues, and housing construction, which is easier to quantify in dollar amounts.

The community perceptions analysis seeks to qualitatively analyze the value of preserving social amenities and/or development opportunities by alternative. A variety of stakeholders and affected groups have been considered in this analysis. Those include the Cities of Las Vegas and North Las Vegas, Las Vegas Paiute Tribe, community and resource groups, federal and state entities, educational institutions, utilities, developers, and recreation groups. Because community perceptions are difficult to evaluate, significance criteria for impacts to community perceptions and values must rely on values that each group places on preservation versus development of CTA study area resources and how each alternative accommodates those values (see Section 3.13.2, "Community Perceptions," for more information on

stated community perceptions and values, by stakeholder). The USU Community Interests Study (USU 2008b), when completed, will provide additional information that may add to this analysis.

Population and Demographics

Increases in population are projected to range from 1.2% to 3.5% annually over a 20-year period (Table 4.13-1). The change in rate of population growth is expected to remain consistent with local trends, with or without disposal acreage in the varying alternatives. It is assumed that under higher conservation alternatives, development will likely occur elsewhere. However, under the higher development alternatives, development would occur within the disposal area, where land is better suited to accommodate growth, thus limiting the potential for leapfrog development on lands adjacent to the CTA study area.

Table 4.13-1. Clark County Population Projections, 2008–2028

Year	Total Population	Change Previous Year	% Change
2008	2,008,063	–	–
2009	2,077,463	69,400	3.5%
2010	2,148,122	70,659	3.4%
2011	2,214,959	66,837	3.1%
2012	2,282,119	67,160	3.0%
2013	2,333,291	51,172	2.2%
2014	2,383,896	50,606	2.2%
2015	2,433,175	49,278	2.1%
2016	2,481,835	48,661	2.0%
2017	2,529,379	47,543	1.9%
2018	2,575,723	46,344	1.8%
2019	2,621,096	45,373	1.8%
2020	2,666,119	45,024	1.7%
2021	2,710,303	44,184	1.7%
2022	2,751,964	41,661	1.5%
2023	2,791,161	39,196	1.4%
2024	2,828,208	37,047	1.3%
2025	2,863,501	35,294	1.2%
2026	2,916,646	53,145	1.9%
2027	2,966,999	50,352	1.7%
2028	3,014,975	47,976	1.6%

Source: NSD (2008).

Population calculations for developable land within the CTA disposal area were determined using density scenarios provided by the City of Las Vegas. According to recommendations in the Upper Las Vegas Development Report, estimated site density should average 10 dwelling units per acre (RMI 2008).

The average projected number of persons per acre at build-out was estimated at approximately 24.3 individuals. Table 4.13-2 gives population estimates by alternative.

Employment

Significance criteria for socioeconomic impacts were determined by analyzing fluctuations in Las Vegas metropolitan area employment. This analysis allows specific determination of thresholds beyond which changes in employment would noticeably affect individuals and communities. Employment in the Las Vegas metropolitan area has increased every year between 1985 and 2007. The trend in employment shows that the average annual percent increase in labor force over this time period was 5.6%. The lowest annual percent increase occurred between 2001 and 2002 (0.6%), and the highest increase occurred between 1993 and 1994 (12.4%).

Table 4.13-2. Projected Population at Build-Out for Each Alternative

Alternative	Total Developable Acreage	Projected Population
A	370.8	9,010
B (Preferred Alternative)	2,827.5	56,118
C	6,960.9	169,150
D	8,022.7	194,952
E	10,010.3	243,250
No Action	12,174.5	295,840

The annual deviations between actual change and average change form the basis for determining a threshold of significance. The deviations yield threshold values of −5.0% and 6.8%, wherein those values are the upper and lower limits of a range of change within which the LVV would have the capacity to absorb increases or decreases in employment. Thus, a significant impact would be an increase of more than 6.8% or a decline of more than 5.0% from the average projected level of employment of 5.6% (Figure 4.13-1).

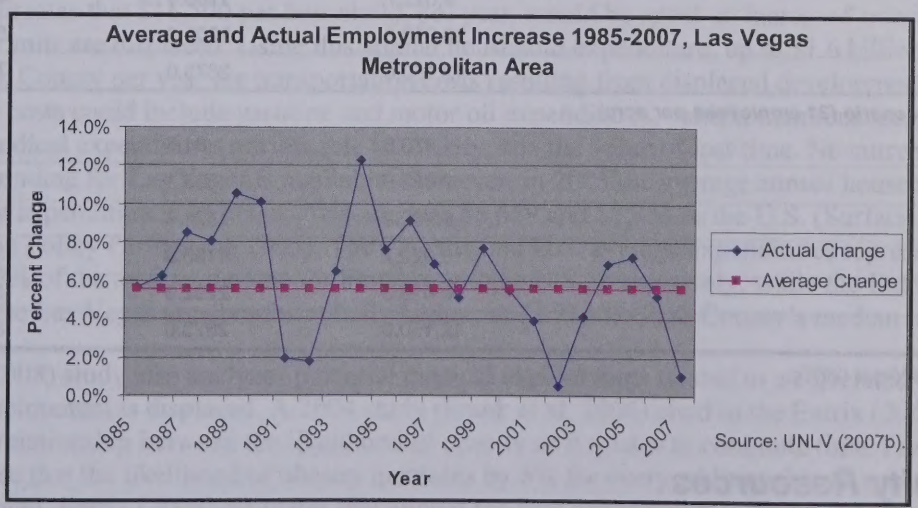

Figure 4.13-1. Average and actual employment increase between 1985 and 2007, Las Vegas metropolitan area.

In order to calculate projected employment under each alternative scenario, the *Mountain Edge Parkway Feasibility Study* (Mountain Edge Study) (City of Las Vegas 2007c), completed in cooperation with the Cities of Las Vegas and North Las Vegas, was consulted to determine possible employment projections for portions of the CTA study area. In the Mountain Edge Study, employment was determined using floor area ratios to estimate the amount of building space against total land area on which the building is located. As well, market-based estimates of employee per square foot averages were used to project jobs. Finally, the average commercial land use percentage (which includes office, industrial, and retail) was determined to be 22% of total land use in developable areas. Based on the Mountain Edge Study calculations, an estimate of potential employment was determined for three-year 2045 build-out scenarios—low, medium, and high (City of Las Vegas 2007c). Using the numbers derived from the Mountain Edge Study, an estimate of 20.9 employees per acre under the low-density scenario, 26.4 under the medium-density scenario, and 31 under the high-density scenario was used to estimate a projected range of employment for each alternative. Table 4.13-3 provides estimates of potential employment on developable acreages by alternative and density scenario. These numbers do not take into account possible fluctuations in employment as construction-related jobs are generated during build-out.

Table 4.13-3. Projected Employment by Alternative and Density Scenario

Alternative	Total Developable	Commercial Acreage (22%)	Projected Employment*
Low-Density Scenario (20.9 employees per acre)			
A	370.8	81.6	1,705
B (Preferred)	2,827.5	508.1	10,619
C	6,960.9	1531.4	32,006
D	8,022.7	1765.0	36,888
E	10,010.3	2202.3	46,027
No Action	12,150.0	2673.0	55,866
Medium-Density Scenario (26.4 employees per acre)			
A	370.8	81.6	2,154
B (Preferred)	2,827.5	508.1	13,413
C	6,960.9	1531.4	40,429
D	8,022.7	1765.0	46,596
E	10,010.3	2202.3	58,140
No Action	12,150.0	2673.0	70,567
High-Density Scenario (31 employees per acre)			
A	370.8	81.6	2,529
B (Preferred)	2,827.5	508.1	15,750
C	6,960.9	1531.4	47,473
D	8,022.7	1765.0	54,715
E	10,010.3	2202.3	68,270
No Action	12,150.0	2673.0	82,863

Source: City of Las Vegas (2007c).

* At 2045 build-out.

Community Resources

Community resources that could be impacted by any of the given alternatives include housing, crime, public facilities and services, public service expenditures, public safety, education, and health care.

In terms of significance criteria, impacts to these resources would be significant if the population increase under a given alternative is considered significant. Demands on community resources will be guided by the significance and impact of population increases to any of the given resources.

A joint study by the Cities of Las Vegas and North Las Vegas analyzes the potential costs of displaced development in Clark County (Entrix 2008). The study analyzes transportation impacts, such as energy costs and car maintenance, travel time, and transportation and obesity, as well as potential environmental and socioeconomic impacts related to displaced development and density-related effects. The study found that "the most significant expected economic impacts of the displaced development scenario are transportation-related" (Entrix 2008:10).

The Entrix study proposes that an average of 8 units per acre would be lost by lands added to the CTA. Using this estimate by Entrix (2008), under Alternatives A–D, between 2,411 and 63,260 units could be displaced (Table 4.13-4). No units would be displaced under Alternative E and the No-Action Alternative, as the CTA acreage would be reduced by 1,686 or 3,551 acres; in fact, more units could be built.

Table 4.13-4. Displaced Development Scenarios*

Alternative	Alternative Boundary (acres)	Original CTA Boundary (acres)	Change in Acreage between Original CTA and Alternative (acres)	Displaced Housing Units (8 units/acre) on Change in Acreage
A	12,952.50	5,000.00	7,952.50	63,620
B (Preferred)	10,495.6	5,000.00	5,495.6	43,965
C	6,362.30	5,000.00	1,362.30	10,898
D†	5,301.40	5,000.00	301.4	2,411
E	3,313.80	5,000.00	−1,686.20	NA‡
No Action	1,448.20	5,000.00	−3,551.80	NA‡

* Based on Entrix (2008) units per acre.

† Alternative D represents the original CTA boundary, which was subsequently adjusted to correct for acreage discrepancies in the LVVDB FEIS and reflect greater accuracy in acreage calculation.

‡ Both Alternative E and the No-Action Alternative would add developable acreage; therefore, there would be no displaced housing units under these alternatives.

The study estimates that $16,500 per household, per year, would be spent on increased transportation costs if these units are displaced. Using this annual household expenditure, up to $1.6 billion could be spent in Clark County per year for transportation costs resulting from displaced development (Entrix 2008). These costs could include gasoline and motor oil expenditures, vehicle maintenance, carbon emissions, medical expenditures attributable to obesity, and the value of lost time. No current, average household spending for Las Vegas is available. However, in 2005 the average annual household transportation expenditure in Phoenix, Arizona, was $8,659 and $7,781 in the U.S. (Surface Transportation Policy Partnership 2005). The Phoenix and U.S. average expenditures represent between 16% and 17.5% of the median income for Phoenix and the U.S., respectively, while the Entrix (2008) estimate for the Las Vegas area is substantially higher, at 32.7% of Clark County's median income.

The Entrix (2008) study also analyzes potential medical expenditures related to a correlated increase in obesity if development is displaced. A 2004 study (Frank et al. 2004) cited in the Entrix (2008) report analyzes the relationship between the likelihood of obesity as it relates to commute time. Frank et al. (2004) propose that the likelihood of obesity increases by 6% for every additional hour spent commuting. Using this model, Entrix (2008) estimates that annual medical expenditures within Clark County could increase from $21 million to $367 million, a 5.72% increase in obesity-related medical spending, if 8,000 acres are added to the CTA.

Entrix (2008) summarizes observed trends in quality of life and social and economic impacts related to urban sprawl. Sprawl can lead to low-income households being concentrated in inner city cores, inner city employment shortages, and more expensive housing in the suburban and exurban areas. These trends would be consistent with historic development trends in Clark County.

Population growth is a prime indicator of economic growth and the corresponding impacts to community resources. The Entrix (2008) study estimates monetary impacts related to displaced development by measuring several variables described above. Alternatively, this socioeconomic analysis measures impacts to community resources against population growth; the impact would be significant if the population increase under a given alternative is considered significant.

Taxes and Revenues

Impacts to taxes and revenues are considered in terms of the potential effects on the productive capacity of the land. Productive gains would include revenue generated from disposal (sale) of the land, as well as revenue from potential development (i.e., property taxes). It is important to note that under every alternative, there would be an increase in tax revenue for the Cities of Las Vegas and North Las Vegas, as well as Clark County, because some amount of land would be disposed of and potentially developed. Under all six alternatives, land development activities associated with the sale of BLM lands would be expected to generate positive economic benefits within Clark County. For the purpose of this analysis, all spending is assumed to occur in Clark County. The majority of the benefits would result from the construction of residential units; however, construction expenditures are based on the organization of three major land use categories (single-family, multi-family, and non-residential development). Construction of non-residential development would contribute directly and indirectly to economic benefits but to a lesser degree than residential development.

In support of the 2004 LVVDB FEIS (BLM 2004a), a comprehensive economic analysis was completed that examined the fiscal impacts of the initial land disposal proposals in the LVV area. For this SEIS, the dollar amounts in the 2004 analysis (BLM 2004a) have been adjusted for inflation and converted to 2008 dollars using a 1.06 inflator (National Aeronautics and Space Administration 2008).

The potential economic impacts in the 2004 LVVDB FEIS were estimated using the IMPLAN Pro I-O model. Input-output modeling is a mathematical accounting of the flow of dollars and commodities through an area's economy. The model provides an estimate of how a given amount of a particular economic activity translates to income in the area. It predicts how expenditures would affect specific industries within the area as dollars are spent and re-spent locally. The IMPLAN results are expressed as a culmination of construction and other commercial industries and are discussed in terms of local output. In general, economic impacts would result from development of disposed lands; thus, the results of the IMPLAN model reflect the indirect impacts of proposed BLM land disposal alternatives. Details of the initial assumptions made in the 2004 analysis can be found in the LVVDB FEIS (BLM 2004a:Appendix E).

Impacts to the local economy, government revenues, as well as property valuation and taxation based on the six alternatives have been considered in the analysis below. For this analysis, construction costs and spending resulting from the development of new residential and non-residential units within the project area are direct impacts. Indirect impacts are considered additional industry sectors that would be impacted as a result of the construction. These industries include wholesale trade, real estate, food and beverage stores and establishments, and offices of physicians, dentists, and other health care professionals. Indirect business taxes resulting from each alternative consist of excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses. The average annual property tax was determined based on a range of LVV tax rates; in 2004 the average tax rate was $2.950 per $100 of assessed value. The 2004 IMPLAN analysis

(BLM 2004a) uses this assumption to determine the number of homes that would be constructed, as well as the average value per acre ($94,000) based on BLM land sold in Clark County in 2004. Land values for the project area are anticipated to appreciate by 7% per year; as such, the annual property valuation and taxation amounts would increase in the years preceding build-out. The annual economic dollar impacts resulting from each of the alternatives (at full build-out) are shown in the tax and revenue analysis below (Table 4.13-5).

Table 4.13-5. Annual Construction, Commercial, and Taxation Revenue, by Alternative

	Lands Available for Disposal (acres)	% of Original Disposal Boundary Acreage (46,700)	2004 Dollars (BLM 2004a)	2008 Adjusted (1.06 inflator)
Annual, Construction Costs/Industry				
A	370	0.8%	$6,804,399	$7,212,663
B (Preferred)	2,826	5.0%	$42,573,471	$45,127,880
C	6,961	14.9%	$128,014,658	$135,695,538
D	8,022	17.2%	$147,526,733	$156,378,337
E	10,103	21.6%	$185,796,882	$196,944,694
No Action	12,150	26.0%	$223,441,761	$236,848,267
Annual, Other Commercial Costs/Industry (indirect)				
A	370	0.8%	$4,267,383	$4,523,426
B (Preferred)	2,826	5.0%	$26,699,980	$28,301,979
C	6,961	14.9%	$80,284,476	$85,101,544
D	8,022	17.2%	$92,521,486	$98,072,775
E	10,103	21.6%	$116,522,635	$123,513,993
No Action	12,150	26.0%	$140,131,645	$148,539,544
Annual, Government and Taxation Revenue				
A	370	0.8%	$332,869	$352,841
B (Preferred)	2,826	5.0%	$2,082,682	$2,207,642
C	6,961	14.9%	$6,262,439	$6,638,185
D	8,022	17.2%	$7,216,964	$7,649,982
E	10,103	21.6%	$9,089,128	$9,634,476
No Action	12,150	26.0%	$10,930,704	$11,586,547
Annual, Property Valuation and Taxation				
A	370	0.8%	$2,400,169	$2,544,179
B (Preferred)	2,826	5.0%	$15,017,272	$15,918,308
C	6,961	14.9%	$45,155,606	$47,864,942
D	8,022	17.2%	$52,038,252	$55,160,547
E	10,103	21.6%	$65,537,579	$69,469,834
No Action	12,150	26.0%	$78,816,350	$83,545,331
Total				
A	–	–	$13,804,821	$14,633,110
B (Preferred)	–	–	$86,373,405	$91,555,809
C	–	–	$259,717,179	$275,300,210
D	–	–	$299,303,435	$317,261,641
E	–	–	$376,946,223	$399,562,996
No Action	–	–	$453,320,460	$480,519,688

The economic impact of each alternative is extrapolated from the 2004 LVVDB FEIS impacts analysis (BLM 2004a); the results are based on lands available for disposal under the current alternatives (see Table 2.4-2) in relation to the original disposal acreage of 46,700 acres as a percentage of the following: 1) annual economic impact of residential construction spending; 2) commercial construction spending; and 3) business and property tax revenue from the proposed action in the LVVDB FEIS (BLM 2004a:Tables 4.12-2, 4.12-4, and 4.12-5). Unlike the economic analysis in the LVVDB FEIS, this analysis does not forecast a timeline for development. No timeline for development is included because development, by nature, is so speculative and uncertain; because there is no development timeline, no cumulative total of the economic impacts of a given alternative can be discussed. Rather, financial estimates are provided for annual impacts, at full build-out for each alternative.

4.13.2 Impact Thresholds

Socioeconomic significance thresholds discussed in Section 4.13.1, "Analysis Approach and Assumptions," are summarized below:

- Significance criteria for impacts to community perceptions and values must rely on values that each group places on preservation vs. development of CTA study area resources and how each alternative accommodates those values (see Section 3.13.2, "Community Perceptions," for more information on stated community perceptions and values, by stakeholder). The USU Community Interests Study (USU 2008b), when completed, will provide additional information that may add to this analysis.
- Significance criteria for population are based on whether implementation of an alternative would result in an exceedance of the lowest or highest population fluctuations experienced in Clark County between 1985 and 2007. The average annual increase over this period was 5.8%. The lowest percentage of population increase occurred between 2006 and 2007 (4.2%), and the highest increase occurred between 1989 and 1990 (8.7%) (UNLV Center for Business and Economic Research 2007b).
- Significant impacts to community resources are based on whether the population increase under a given alternative is considered significant, as defined above.
- Significance criteria for employment are based on whether implementation of an alternative would result in an exceedance of the lowest or highest fluctuations in labor force experienced in the Las Vegas metropolitan area between 1985 and 2007. The lowest annual percent increase occurred between 2001 and 2002 (0.6%), and the highest increase occurred between 1993 and 1994 (12.4%). The annual deviations between actual change and average change form the basis for determining a threshold of significance. The deviations yield threshold values of −5.0% and 6.8%, wherein those values are the upper and lower limits of a range of change within which the LVV would have the capacity to absorb increases or decreases in employment. Thus, a significant impact would be an increase of more than 6.8% or a decline of more than 5.0% from the average projected level of employment of 5.6% (see Figure 4.13-1).

4.13.3 Factors under all Alternatives that Would Cause Change to Existing Socioeconomic Conditions

The following factors would cause change to existing socioeconomic conditions:

- The change in rate of population growth across all alternatives is expected to remain consistent with local trends. It is assumed that in the alternatives with lower acreages of developable land, new development will likely occur elsewhere. However, under the higher development

alternatives, development would occur within the LVVDB, where land is better suited to accommodate growth.

- The population of Clark County is expected to increase by 1.2% to 3.5% annually over the next 20 years.
- Long-term rate of population growth is expected to occur under any of the action alternatives. Therefore, the action alternatives are not expected to directly contribute to population increases that would have a substantial adverse effect on public facilities and services.
- Implementation of any of the alternatives would result in an increase in property taxes and economic activity because some amount of land will be disposed of, and potentially developed, under any scenario. Details of potential economic gains from development of disposed lands are presented below.
- There would be a reduction in potential revenue to the SNPLMA account available for parks and recreation as a result of the reduced amount of land available for the disposal at auction under the alternatives.

4.13.4 Alternative A

Actions Proposed under Alternative A that Would Cause Change to Existing Socioeconomic Conditions

Under Alternative A, 12,952.5 acres would be preserved as the CTA and would be unavailable for private development. The total developable acreage available to the Cities of Las Vegas and North Las Vegas would be 370.8 acres, representing the lowest available acreage for development offered under any of the other alternatives.

Direct and Indirect Impacts

COMMUNITY PERCEPTIONS

Cities of Las Vegas and North Las Vegas

The primary goal of the Cities of Las Vegas and North Las Vegas is to balance the preservation of natural resources with the need to accommodate additional development in the growing LVV. Under Alternative A, the cities may experience added pressure to develop in less desirable areas in order to accommodate the need for development as population continues to rise. The result, according to the cities, is that leapfrog development would occur and there would be more inefficient placement related to utility construction and transportation infrastructure. If this were to occur, there would be a significant, direct, adverse impact to both cities as a result of Alternative A.

Las Vegas Paiute Tribe

The LVW is a highly significant spiritual, cultural, historical, anthropological, and ecological part of Paiute heritage. Preservation of both the LVW and surrounding areas would help to maintain ancient burial grounds and other sacred sites to the maximum extent possible. By limiting development in areas surrounding the Paiute Reservation, it is likely that resort amenities, both current and planned, for the tribe would have value added by maintaining undeveloped surroundings. Therefore, under Alternative A, the Las Vegas Paiute would experience a direct, positive impact as perceived by the Tribe.

Community Resource Groups

Alternative A would provide a direct, beneficial impact, as far as community perception, to community resource groups who have expressed interest in preservation of the entire CTA study area boundary.

Federal and State Entities

Of primary concern to federal and state entities is the desire to maintain natural resources to the extent possible while also allowing for competent management of the future CTA boundaries and associated Tule Springs and Eglington Preserve sites. Alternative A would therefore provide a direct, positive benefit to federal and state entities.

Educational Institutions

Alternative A would provide a direct, beneficial impact to educational institutions that have expressed interest in preservation of the entire CTA boundary for the purposes of educating the public about existing natural resources. Additionally, a reduction in BLM land sales would result in less money going into the State of Nevada General Education Fund. Under the SNPLMA, 5% of the revenue generated from BLM land sales goes into that fund.

Utilities

The general consensus among interested utility groups is to maintain existing ROWs within the CTA boundaries while also allowing for the protection of potential future ROWs necessary to accommodate current and future demand.

Developers

Alternative A could result in a direct, adverse impact to the development community, which hopes to use public land as productively as possible in order to meet the demands of the growing LVV population. However, availability of developable land outside the CTA could offset this adverse impact.

Recreation Groups

Recreation groups would experience negligible social impacts under Alternative A. Recreation opportunities and activity would likely remain as it presently exists; the only exception would be among OHV users who currently use the CTA for off-road vehicle use and other motorized off-trail activities.

POPULATION AND DEMOGRAPHICS

Under Alternative A, it is expected that approximately 9,010 individuals would occupy developable disposal lands at build-out (see Table 4.13-2). The change in rate of population growth is expected to occur independent of any changes in the disposal boundaries. The result, according to the cities, is that leapfrog development would occur and there would be more inefficient placement related to utility construction and transportation infrastructure. If this were to occur, there would be a significant, direct, adverse impact to both cities as a result of Alternative A.

EMPLOYMENT

Under Alternative A, it is expected that between 1,705 and 2,529 new employment opportunities would result at total build-out in 2045. This would represent a 0.5% to 0.7% increase in overall employment by 2045 (see Table 4.13-3). Based on the significance criteria discussed above, this would result in a direct, adverse impact to employment in the area, as the projected growth rate is more than 5% lower than the expected growth rate.

Indirect, adverse impacts may occur as a result of the loss of potential workers who could benefit from disposal of developable land within the CTA study area. It is expected that a portion of potential jobs that would be unavailable under this alternative would shift to other areas in the LVV where economic opportunities still exist, but not enough to compensate for current and future city needs.

COMMUNITY RESOURCES

Based on the significance criteria for employment, and by extension, community resources, implementation of Alternative A could directly and indirectly adversely impact the location and costs of providing public facilities and services in the community. This would be because of a decrease in the housing inventory that would thereby affect public service expenditures. A study sponsored by the Cities of Las Vegas and North Las Vegas estimates that transportation costs could increase by as much as $1.06 billion annually at full build-out as a result of displaced development and the costs associated with longer commute times between work and home, entertainment, and retail centers (Entrix 2008). However, because implementation of Alternative A is not expected to contribute to population increases that would have a substantial adverse effect on community resources or services, there are not likely to be any significant impacts to the provision of police, fire, hospitals, or libraries.

Overall population is expected to increase annually by 1.4% to 5.3% through 2025. The rate of enrollment in the Clark County School District has increased by 3.9% to 5.9% annually since 2001 (see "Educational Institutions"). Increases in school enrollment that result from population migration and an increase in housing in the LVV would have to be incorporated into the school district's projected growth plans. However, implementation of Alternative A will not likely increase the demand for additional educational facilities in the district because the Clark County School District has plans to accommodate a 5% increase in enrollment. Additionally, because implementation of Alternative A is not expected to contribute to population increases that would have a substantial adverse effect on community resources or services, impacts to education are not expected to be significant.

Implementation of Alternative A would not be expected to have direct or indirect impacts to the supply of water or solid waste disposal in the LVV area. Implementation of Alternative A is not expected to contribute to population increases that would have a substantial adverse effect on community resources or services; impacts to the provision of utilities are not expected to be significant.

Based on 2006 population and crime reports (see Chapter 3, "Affected Environment"), the per capita crime rate for the City of Las Vegas is 0.96%, and the rate for the City of North Las Vegas is 2.74%. Minor population increases as a result of an increased housing inventory and other land uses could have a direct, adverse impact to crime and the attendant need for public safety resources and facilities (police, fire, etc.) under Alternative A; however, the population is expected to increase with or without the disposal of land within the CTA study area, so this impact is not expected to be significant. While illegal activity (dumping, etc.) could continue and the remoteness of portions of the CTA could impact the ability of public safety officials to respond to recreationists in the CTA, no direct or indirect adverse impacts are anticipated because the area already consists of vacant, undeveloped desert with the same risks.

There are plans for increasing the capacity of the health care system in the Cities of Las Vegas and North Las Vegas, as well as the LVV. Implementation of Alternative A is not expected to contribute to population increases that would have a substantial adverse effect on the demand for additional health care facilities in the area. Therefore, no direct or indirect impacts are anticipated.

TAXES AND REVENUES

Taxes and other sources of revenue provide the state, counties, and communities with discretionary dollars to develop infrastructure and support the population. Nevada does not have corporate or personal income tax; therefore, property taxes and PILT are important sources of revenue for the state, counties, and communities. Median and mean property taxes are detailed by city in Appendix J (see Table J-12).

Under Alternative A, only 370.8 acres would be made available for development. Implementation of Alternative A would result in a reduced amount of land available for development, which would provide some increased tax revenues to the cities and other governmental jurisdictions when the land is developed. However, municipalities would receive the least amount of tax revenue to fund infrastructure projects under Alternative A. An estimated $2.9 million in annual tax revenue would be generated if Alternative A is implemented and the full 370.8 acres are developed (see Table 4.13-5). While implementation of this alternative is expected to result in an increase in taxes and revenues, of the six alternatives presented for analysis, Alternative A would result in the least amount of tax revenue for Clark County and the Cities of Las Vegas and North Las Vegas. In addition, there would be a reduction in funds generated for the SNPLMA account under Alternative A that would reduce the ability of the BLM and other eligible agencies to complete conservation initiatives and acquire environmentally sensitive lands in the future. There would also be a reduction in funds available to the SNWA and the General Education Fund through the SNPLMA account.

Additionally, the potential for leapfrog development is higher under Alternative A, as the likelihood of development along non-contiguous parcels of land is greater when more land is conserved in a rapidly urbanizing area. Leapfrog development could place additional demands on new public infrastructure, resulting in a higher cost of supplying infrastructure than other alternatives. The estimated annual tax revenue may not be enough to offset these costs. Therefore, implementation of this alternative could result in a negative impact to taxes and revenues, relative to the other project alternatives.

ECONOMIC ENVIRONMENT

Implementation of Alternative A will not likely increase or alter the demand for gaming opportunities in the area. However, implementation of Alternative A could have a direct, beneficial impact to tourism. The CTA and other federal lands in the LVV could be used for hiking, camping, mountain biking, scenic and wildlife viewing, etc. This increase in recreation could result in an indirect, beneficial impact to the economic environment as a result of increases in economic activity in the local economy, including increased jobs, tax revenue, etc. Employment in the arts, entertainment, and recreation industry sector is only 2.9% of the total employment in Clark County. Any increases in jobs as a result of increased recreation opportunities would be minor.

Development of the 370.8 acres also has the potential to generate an additional $7.2 million annually in construction spending (see Table 4.13-5) and an additional $4.5 million annually in other commercial expenditures (BLM 2004a). The annual $7.2 million in construction spending would be an increase of 0.08% over the 2006 GDP for the construction industry in the Las Vegas–Paradise metropolitan statistical area (BEA 2008). As previously noted (see Section 3.13.5, "Community Resources"), the average percent change for GDP contribution by the construction industry was 12.99% between 2001 and 2006.

Mitigation Measures and Unavoidable Adverse Impacts

Based on the significance criteria identified for employment, Alternative A could result in a direct, adverse impact to employment in the area, as the projected growth rate is more than 5% lower than the expected growth rate. No mitigation measures have been proposed to lessen the impacts expected under this alternative.

A significant, direct, adverse impact to the Cities of Las Vegas and North Las Vegas, as well as utility groups, would likely occur, as less land would be made available for development and more restrictions on utility infrastructure would be in place. A significant loss in community values for the cities could occur, as the desire to balance the need for development and more recreation opportunities for residents would not be realized. Utility groups would similarly be affected, as the need to accommodate current and future growth would come at greater economic costs, since redundant utility infrastructure would be required to sufficiently service residents of the Cities of Las Vegas and North Las Vegas.

No mitigation measures have been proposed to offset adverse impacts to socioeconomics under this alternative.

4.13.5 Alternative B (BLM Preferred Alternative)

Actions Proposed under Alternative B that Would Cause Change to Existing Socioeconomic Conditions

Under Alternative B, 2,827.5 acres of land would be available for development for the Cities of Las Vegas and North Las Vegas. Under this alternative, 10,495.6 acres would be preserved as the CTA and would be unavailable for private development.

Direct and Indirect Impacts

COMMUNITY PERCEPTIONS

Under Alternative B, impacts to stakeholders and affected groups would largely reflect those discussed under Alternative A. Groups that would experience additional impacts under this alternative would include the Las Vegas Paiute and community resource groups.

The Las Vegas Paiute would experience minor adverse impacts under this alternative, as the northeast corner of the Paiute Reservation would not be buffered from adjacent development. The impact is considered minor, as preservation of the LVV and surrounding areas would largely remain intact. As well, adjacent development would occur in areas at a distance from the existing resort.

Resource groups who have expressed the desire for maximum protection of CTA boundaries will experience direct, adverse impacts from a community perception standpoint. However, this impact is not considered significant, as the majority of lands within the CTA study area would be preserved.

POPULATION AND DEMOGRAPHICS

Under Alternative B, it is expected that approximately 56,118 individuals will occupy developable disposal lands at build-out (see Table 4.13-2). Impacts to population will remain consistent with those discussed in Alternative A, as the change in rate of population growth is expected to occur independent of any changes in the disposal boundaries.

EMPLOYMENT

Under Alternative B, it is expected that between 10,619 and 15,750 new employment opportunities would result at total build-out in 2045. This would represent an overall employment growth rate between 3% and 4.5% (see Table 4.13-3). Based on the significance criteria, this would represent an overall decline in projected employment during the period, although not to a significant degree. Impacts to employment under this alternative would therefore be considered direct and adverse.

Indirect impacts may occur as a result of fewer potential workers because of less developable land, compared with the other, more heavily developed, alternatives. It is expected that those potential jobs would shift to other areas in the LVV where economic opportunities still exist.

COMMUNITY RESOURCES

The direct and indirect impacts of disposal and development, as well as conservation of public lands, under Alternative B would generally reflect the impacts to community resources described under Alternative A but on 2,827.5 rather than 370.8 acres of land. Substantially more land would be potentially developable under this alternative, although population and employment impacts are not expected to increase significantly; therefore, impacts to community resources would be expected to increase proportionate to additional acreage. Therefore, because implementation of Alternative B is not expected to contribute to population increases that would have a substantial adverse effect on community resources or services, there are not likely to be any significant impacts to the provision of police, fire, hospitals, or libraries.

TAXES AND REVENUES

Under Alternative B, 2,827.5 acres would be available for disposal and potential development. Potential tax and revenue impacts under this alternative would include a proportional increase over Alternative A in property tax revenue generated because more acreage would be disposed of and potentially developable. An estimated $18.1 million in annual tax revenue could result if Alternative B is implemented and the 2,827.5 acres are developed (see Table 4.13-5). Therefore, implementation of Alternative B is expected to result in a direct, beneficial impact to taxes and revenues in Clark County; this revenue could be used to support and fund new area infrastructure.

ECONOMIC ENVIRONMENT

Impacts to gaming and tourism under Alternative B would be similar to those described under Alternative A.

Land development activities associated with disposal of BLM land are expected to generate positive economic benefits in the area. Benefits would result from increased residential development from construction spending in the county. At full build-out, development of the 2,827.5 acres has the potential to generate an additional $45.12 million annually in construction spending (see Table 4.13-5) and an additional $28.31 million annually in other commercial expenditures (BLM 2004a). This would be an increase of 0.51% over the 2006 GDP for the construction industry in the Las Vegas–Paradise metropolitan statistical area (BEA 2008).

Mitigation Measures and Unavoidable Adverse Impacts

Significant impacts to the Cities of Las Vegas and North Las Vegas, as well as utility groups, would be similar to those discussed under Alternative A. No additional unavoidable adverse impacts would occur

under Alternative B. In addition, no mitigation measures have been proposed to minimize any adverse impacts experienced under this alternative.

4.13.6 Alternative C

Actions Proposed under Alternative C that Would Cause Change to Existing Socioeconomic Resources

Under Alternative C, 6,960.9 acres of land would be available for development by the Cities of Las Vegas and North Las Vegas, and 6,362.3 acres would be preserved as the CTA and would be unavailable for development.

Direct and Indirect Impacts

COMMUNITY PERCEPTIONS

Under Alternative C, development along both the northern and southern boundaries of the LVV would be permitted. Under this alternative, the disposal of more acreage for potential development is likely to result in a direct, positive impact to the cities, utilities, and developers.

Direct, adverse impacts to the Paiute Tribe, educational institutions, and community resource groups would occur, as the protection of natural resources is less under this alternative than under Alternatives A or B. Impacts are expected to be minor, as there would still be an emphasis on protection of natural resources, but there would be added deference to accommodating needed development and recreation infrastructure.

POPULATION AND DEMOGRAPHICS

Under Alternative C, it is expected that approximately 169,150 individuals will occupy developable disposal lands at build-out (see Table 4.13-2). Impacts from an increase in population will remain consistent with those discussed under Alternative A.

EMPLOYMENT

Under Alternative C, it is expected that between 32,006 and 47,473 new employment opportunities would result at total build-out in 2045. This would result in an overall employment increase of 9.1% to 13.5% (see Table 4.13-3). Based on the significance criteria, this alternative would result in an overall increase in employment within the disposal boundaries. A negligible, indirect impact may occur as a result of fewer potential workers because of more limited developable land. It is expected that those potential jobs would shift to other areas in the LVV where economic opportunities still exist.

COMMUNITY RESOURCES

The direct and indirect impacts of disposal and development, as well as conservation of public lands under Alternative C, would have similar effects on community resources as those described under Alternative A, but with proportional differences as a result of different acreages in the developed and undeveloped areas. Therefore, as with Alternatives A and B, implementation of Alternative C is not expected to contribute to population increases that would have a substantial adverse effect on community resources or services. Therefore, there are not likely to be any significant impacts to the provision of police, fire, hospitals, or libraries.

TAXES AND REVENUES

Under Alternative C, 6,960.9 acres would be available for disposal and potential development. Implementation of this alternative would result in an increase in potential taxes and revenues, compared with current conditions. More land would be disposed of and potentially developed, so impacts to taxes and revenues under this alternative would include a proportional increase over Alternative A. An estimated $54.5 million in annual tax revenue could result if Alternative C is implemented and the 6,961.9 acres are developed (see Table 4.13-5). Therefore, implementation of Alternative C is expected to result in a direct, beneficial impact to taxes and revenues in Clark County; this revenue could be used to support and fund new area infrastructure.

ECONOMIC ENVIRONMENT

Impacts to gaming and tourism under Alternative C would be similar to those described under Alternatives A and B; however, there would be fewer opportunities for passive recreation under this alternative because more land would be disposed of and potentially developed. Developed recreation opportunities would be included as part of any new private development.

Land development activities associated with disposal of BLM land are expected to generate positive economic benefits in the area. Benefits would result from increased residential development from construction spending in the county. At full build-out, development of the 6,960.9 acres has the potential to generate an additional $135.6 million annually in construction spending (see Table 4.13-5) and an additional $85.1 million annually in other commercial expenditures (BLM 2004a). This would be an increase of 1.53% over the 2006 GDP for the construction industry in the Las Vegas–Paradise metropolitan statistical area (BEA 2008).

Mitigation Measures and Unavoidable Adverse Impacts

Under Alternative C, no unavoidable adverse impacts to economic sectors and employment would occur. In addition, no mitigation measures have been proposed to offset impacts associated with this alternative.

4.13.7 Alternative D

Actions Proposed under Alternative D that Would Cause Change to Existing Socioeconomic Resources

Under Alternative D, 8,022.7 acres of land would be available for development by the Cities of Las Vegas and North Las Vegas, and 5,301.4 acres would be preserved as the CTA.

Direct and Indirect Impacts

COMMUNITY PERCEPTIONS

Under Alternative D, impacts would be similar to those under Alternative C but to a greater degree. Developers, cities, and utilities would obtain the most direct benefit under this alternative, while the Paiute Tribe, educational institutions, and community resource groups would experience an overall increase in direct, adverse impacts to their community's values.

POPULATION AND DEMOGRAPHICS

Under Alternative D, it is expected that approximately 194,952 individuals will occupy developable disposal lands at build-out (see Table 4.13-2). Impacts as a result of population changes would remain consistent with those discussed in Alternative A.

EMPLOYMENT

Under Alternative D, it is expected that between 36,888 and 54,715 new employment opportunities would result at total build-out in 2045. This would result in an overall employment increase of 10.5% to 15.6% (see Table 4.13-3). Based on the significance criteria, this alternative would result in an overall increase in employment within the disposal area. Therefore, no adverse impacts to employment are expected to occur under this alternative. Impacts are likely to be beneficial for cities and future residents who move to the area.

COMMUNITY RESOURCES

The direct and indirect impacts of disposal and development, as well as conservation of public lands under Alternative D, would have similar effects on the crime rate as those described for Alternatives A–C but with proportional differences in crime as a result of different acreages in the developed and undeveloped areas.

Direct and indirect impacts to public facilities and services, educational and health care facilities, and public safety under Alternative D would be similar to those described under the other action alternatives. However, these impacts would be expected to proportionately increase as developable area increases and preservation areas decrease.

Direct and indirect impacts to utilities under Alternative D would be similar to those described for Alternatives A–C. Impacts to utilities would increase as development density increases. Alternative D would result in the disposal and potential development of 8,022.70 acres, in contrast to the 370.80 acres available for disposal under Alternative A.

TAXES AND REVENUES

Under Alternative D, approximately 8,022.7 acres would be available for disposal and potential development. Implementation of this alternative would result in an increase in potential taxes and revenues over current conditions. Additionally, because more land would be disposed of and potentially developed, impacts to taxes and revenues under this alternative would include a proportional increase over Alternatives A and C. At full build-out, an estimated $62.8 million in annual tax revenue could result if Alternative D is implemented and the 8,022.7 acres are developed (see Table 4.13-5). Therefore, implementation of Alternative D is expected to result in a direct, beneficial impact to taxes and revenues in Clark County; this revenue could be used to support and fund new area infrastructure.

ECONOMIC ENVIRONMENT

Impacts to gaming and tourism under Alternative D would be similar to those described under the other action alternatives; however, there would be fewer opportunities for recreation under this alternative because more land would be disposed of and potentially developed.

Land development activities associated with disposal of BLM land are expected to generate positive economic benefits in the area. Benefits would result from increased residential development from construction spending in the county. At full build-out, development of the 8,022.7 acres has the potential

to generate an additional $156.3 million annually in construction spending (see Table 4.13-5) and an additional $98 million annually in other commercial expenditures (BLM 2004a). This would be an increase of 1.77% over the 2006 GDP for the construction industry in the Las Vegas–Paradise metropolitan statistical area (BEA 2008).

Mitigation Measures and Unavoidable Adverse Impacts

Under Alternative D, no unavoidable adverse impacts to socioeconomics are expected to occur. In addition, no specific mitigation measures are proposed to offset any adverse impacts associated with this alternative.

4.13.8 Alternative E

Actions Proposed under Alternative E that Would Cause Change to Existing Socioeconomic Resources

Under Alternative E, 10,010.3 acres of land would be available for development by the Cities of Las Vegas and North Las Vegas, and 3,313.8 acres would be preserved as the CTA. Development of disposed acreage could include construction of homes, commercial development, open space, roads and utilities, and other city infrastructure.

Direct and Indirect Impacts

COMMUNITY PERCEPTIONS

Under Alternative E, community perceptions would be similar to those for Alternative D, but to a greater degree. It is expected that resource groups would experience direct, adverse impacts to their community's values, as there would be limitations placed on the protection of natural resources.

POPULATION AND DEMOGRAPHICS

Under Alternative E, it is expected that approximately 243,250 individuals will occupy developable disposal lands at build-out (see Table 4.13-2). Impacts resulting from the population increase will remain consistent with those discussed under Alternative A.

EMPLOYMENT

Under Alternative E, it is expected that between 46,027 and 68,270 new employment opportunities would result at total build-out in 2045. This would result in an overall employment increase of 13.1% to 19.4% (see Table 4.13-3). Based on the significance criteria, this alternative would result in an overall increase in employment within the disposal area. Therefore, no adverse impacts to employment are expected to occur under this alternative. This would be a direct, positive impact for the cities and future residents of the area.

COMMUNITY RESOURCES

The direct and indirect impacts of disposal and development, as well as conservation of public lands under Alternative E, would have similar effects on the crime rate as those described under Alternatives A–D, but with proportional differences in crime as a result of different acreages in the developed and undeveloped areas.

Direct and indirect impacts to public facilities and services, educational and health care facilities, and public safety under Alternative E would be similar to those described under the other action alternatives. However, these impacts would be expected to proportionately increase as developable area increases and preservation areas decrease.

Direct and indirect impacts to utilities under Alternative E would be similar to those described under the other action alternatives. Impacts to utilities would increase as development density increases; Alternative E would result in an increase in developable land (10,010.30 acres), compared with Alternative A (370.80 acres).

TAXES AND REVENUES

Under Alternative E, approximately 10,010.3 acres would be available for disposal and potential development. Implementation of this alternative would result in an increase in potential taxes and revenues over current conditions. Additionally, because more land would be disposed of and potentially developed, impacts to taxes and revenues under this alternative would include a proportional increase over Alternatives A–D. At full build-out, an estimated $79.1 million in annual tax revenue could result if Alternative E is implemented and the 10,010.3 acres are developed (see Table 4.13-5). Therefore, implementation of Alternative E could result in a direct, beneficial impact to taxes and revenues in Clark County.

ECONOMIC ENVIRONMENT

Impacts to gaming and tourism under Alternative E would be similar to those described under Alternatives A and C; however, there would be fewer opportunities for recreation under this alternative because more land would be disposed of and potentially developed.

Land development activities associated with disposal of BLM land are expected to generate positive economic benefits in the area. The benefits of increased construction spending would result from increased residential development in the county. At full build-out, development of the 10,010.3 acres has the potential to generate an additional $196.9 million annually in construction spending (see Table 4.13-5) and an additional $123.5 million annually in other commercial expenditures (BLM 2004a). This would be an increase of 2.22% over the 2006 GDP for the construction industry in the Las Vegas–Paradise metropolitan statistical area (BEA 2008).

Mitigation Measures and Unavoidable Adverse Impacts

Under Alternative E, it is likely that resource groups and other stakeholders intent on maximum protection of resource would consider Alternative E an unavoidable adverse impact, given the community perceptions related to resource preservation and protection. No mitigation measures have been proposed to lessen the effect of the impacts associated with this alternative. Thus, impacts are considered significant.

4.13.9 No-Action Alternative

Actions Proposed under the No-Action Alternative that Would Cause Change to Existing Socioeconomic Resources

Under the No-Action Alternative, 12,174.5 acres of land would be available for development by the Cities of Las Vegas and North Las Vegas, representing the highest developable acreage that would be made

available, compared with the other alternatives. A total of 1,448.2 acres would be preserved and would be unavailable for development. Development of disposed acreage could include construction of homes, commercial development, open space, roads and utilities, and other city infrastructure.

Direct and Indirect Impacts

COMMUNITY PERCEPTIONS

Impacts under the No-Action Alternative would be similar to those under Alternative E but to a greater degree. Groups who have expressed interest in maximum protection would experience an overall direct, adverse impact, given their community perceptions and values as a result of the No-Action Alternative.

POPULATION AND DEMOGRAPHICS

Under the No-Action Alternative, it is expected that approximately 295,840 individuals would occupy developable disposal lands at build-out (see Table 4.13-2). Impacts resulting from the increase in population would remain consistent with those discussed in Alternative A, as the change in rate of population growth is expected to occur independent of any changes in the disposal boundaries.

EMPLOYMENT

Under the No-Action Alternative, it is expected that between 55,866 and 82,863 new employment opportunities would result at total build-out in 2045; this would result in an overall employment increase of 15.9% to 23.6% (see Table 4.13-3). Based on the significance criteria, this alternative would result in an overall increase in employment within the disposal boundary. Therefore, no adverse impacts to employment are expected to occur under this alternative. This would be a direct, beneficial impact for the cities and future residents to the area.

COMMUNITY RESOURCES

The No-Action Alternative would provide the most acreage available for disposal, and ultimately development, allowing for the disposal of 12,174.5 acres. Direct impacts would include an increase in dwelling units in both cities. Indirect impacts could occur as a result of the loss of potential housing on the acres of undevelopable land.

Additionally, the conversion of large tracts of land to private development is seen by some as industrialization and a diminishment of the characteristics they value in the LVV: natural beauty, quiet, vast reaches of unpopulated and undeveloped open space, fresh air, and wildlife. Therefore, the loss of open space as an amenity could be a direct impact resulting from implementation of the No-Action Alternative.

Direct and indirect impacts to the crime rate, public facilities and services, educational and health care facilities, and public safety under Alternative D would be similar to those described under the other alternatives. However, these impacts would be expected to proportionately increase as the developable area increases and the preservation area decreases.

Direct and indirect impacts to utilities under the No-Action Alternative would be similar in scale to those described under the other action alternatives. Impacts to utilities would increase as development density increases; the No-Action Alternative would result in an increase in developable land (12,174.5 acres), compared with Alternative A (370.8 acres).

TAXES AND REVENUES

Under the No-Action Alternative, approximately 12,174.5 acres would be available for disposal and potential development. Implementation of this alternative would result in the largest increase in potential taxes and revenues over current conditions because the No-Action Alternative includes disposal of the largest amount of acreage of the six alternatives. At full build-out, an estimated $95.1 million in annual tax revenue could result if the No-Action Alternative is implemented and the 12,174.5 acres are developed (see Table 4.13-5). Therefore, implementation of the No-Action Alternative is expected to result in a direct, beneficial impact to taxes and revenues in Clark County; this revenue could be used to support and fund new area infrastructure.

ECONOMIC ENVIRONMENT

Impacts to gaming and tourism under the No-Action Alternative would be similar to those under the other alternatives. However, there would be fewer opportunities for recreation under this alternative because more land would be disposed of and potentially developed, and less land than under the other action alternatives would be available for conservation and recreation.

Land development activities associated with disposal of BLM land are expected to generate positive economic benefits in the area. Benefits would result from increased residential development from construction spending in Clark County. At full build-out, development of the 12,174.5 acres has the potential to generate an additional $236.8 million annually in construction spending (see Table 4.13-5) and an additional $148.5 million annually in other commercial expenditures (BLM 2004a). This would be an increase of 2.67% over the 2006 GDP for the construction industry in the Las Vegas–Paradise metropolitan statistical area (BEA 2008).

Mitigation Measures and Unavoidable Adverse Impacts

Under the No-Action Alternative, it is likely that resource groups and other stakeholders intent on maximum protection of natural resource would consider the No-Action Alternative an unavoidable adverse impact to community perceptions related to resource preservation and protection. No mitigation measures have been proposed to lessen the effect of the impacts associated with this alternative. Thus, the impact is considered significant.

4.14 CUMULATIVE IMPACTS

The CEQ regulations that implement NEPA [42 USC 4321 *et seq.*] require an assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" [40 CFR 1508.7]. Cumulative impacts are considered for both the No-Action and action alternatives.

Cumulative impacts were determined by combining the impacts of each alternative with other past, present, and reasonably foreseeable future actions in the vicinity of the CTA study area and, if applicable, the surrounding region. The projects and/or uses listed in Table 4.14-1 were identified for the purpose of conducting the cumulative effects analysis.

Table 4.14-1. Actions Considered for Cumulative Impacts Analysis

Action	Description	Area of Impact	Resources Impacted	Status
Land Development	The LVVDB FEIS assumed approximately 5,000 acres (private and lands sold by BLM) a year would continue to be developed in the LVV through 2018. This was based on development trends throughout Clark County from 1970–2003.	Clark County	All (indirect)	Past, present, and future
Flood Control Channels and Detention Basins	CCRFCD is working to construct and operate additional flood control facilities throughout the LVV.	LVV	Hydrology Earth resources Biological resources Socioeconomics Public safety Visual resources	Past, present, and future
Kern River Pipeline	The Kern River Gas Transmission Company proposes to continue to expand its pipeline system to meet increasing demand.	Utah Nevada California	All	Present and future
SNWA Water Conservation Measures	SNWA is working with local municipalities to achieve more rigorous conservation goals and to implement its *Drought Plan* (SNWA 2007).	Southern Nevada	Hydrology Socioeconomics Recreation	Present and future
Development of Clark County Shooting Park	Clark County is preparing to develop facilities on approximately 900 acres (of the 2,900-acre area) for a recreational shooting park.	LVV	Socioeconomics Recreation Hydrology Hazardous materials	Present
Development of McCool Park	The City of North Las Vegas plans to further develop 80 acres of the 160-acre R&PP Act regional park to include sports fields, picnic sites, playgrounds, lighting, and other amenities.	LVV	Socioeconomics Recreation Hydrology Hazardous materials Cultural resources Paleontological Resources	Present
Protection, Restoration, and Enhancement Projects in the Eglington Preserve	BLM is working cooperatively with the City of North Las Vegas and The Nature Conservancy to protect, restore, and enhance important wash/aquatic systems in Eglington Preserve.	LVV	Hydrology Biological resources Earth resources Recreation	Present
Sheep Mountain Parkway	NDOT, the Federal Highway Association, Clark County, the Nevada RTC, and the Cities of Las Vegas and North Las Vegas have proposed a 550-foot-wide multimodal transportation corridor that provides a link from the Las Vegas Beltway (Interstate 215) to U.S. Highway 95, continuing eastward to link with Interstate 15.	Clark County	All	Future
NV Energy ROW	NV Energy proposes to develop various ROWs throughout the LVV.	LVV	All	Future
West Wide Corridor Designations	Energy corridors are to be designated on federal lands across 11 western states (including Nevada) for the purpose of oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities.	Western U.S.	All (indirect)	Future
Comprehensive Conservation Plan for Desert National Wildlife Refuge	A Comprehensive Conservation Plan is currently being developed for the Desert National Wildlife Complex, which includes the 1.5-million-acre DNWR to the north of the CTA study area.	North Las Vegas Valley	Biological resources Recreation Visual resources	Future
SNWA Pipeline	SNWA proposes to develop a pipeline system for the purpose of transporting groundwater from eastern Nevada to meet growing water demands in the LVV.	Eastern and southern Nevada	All	Future
Open Space and Recreational Trail Development	A variety of recreational trails and open space parks are under development or proposed for development throughout the LVV.	LVV	All	Past, present, and future

Table 4.14-1. Actions Considered for Cumulative Impacts Analysis (Continued)

Action	Description	Area of Impact	Resources Impacted	Status
Floyd Lamb Park Improvements	The City of Las Vegas plans to improve core park facilities, construct a new visitor center and museum, develop facilities for passive recreation activities, and provide for land conservation, historic preservation, and environmental education within the park and adjacent R&PP Act leased lands in the CTA study area.	LVV	All	Future
Solar Energy Development	There are currently as many as 60 proposals for development of solar energy generation facilities in southern Nevada.	Nevada Southwest	All	Future
Expansion of the disposal boundary	Expansion of the LVVDB north along U.S. Highway 95 but south of the ULVW, as suggested by the City of Las Vegas. This type of expansion would require Congressional action.*	Northwest of current disposal boundary	All	Future

* City of Las Vegas (2007d).

4.14.1 Earth Resources

In consideration of past, present, and reasonably foreseeable projects, the actions common to all the alternatives would not have cumulatively considerable impacts related to geological hazards, mineral resources, or soils. Existing regulations and building practices would minimize potential adverse effects involving potential geological hazards on both an individual project basis and a cumulative basis. Implementation of the common actions would contribute to erosion and sedimentation rates in the CTA study area and in downstream reaches of the ULVW; however, as indicated in the hydrologic modeling discussed in Section 4.3, "Water Resources," which considers future conditions in the watershed, the cumulative effect is not expected to be significant. According to the USU (2008a) soils study, the plants of interest occur primarily in spring and basin floor deposits; therefore, cumulative impacts that could degrade these habitats must be mitigated.

Existing regulations pertaining to water quality would minimize any individually or cumulatively significant adverse effects resulting from the construction of new road alignments and utilities.

Alternative A

Cumulative impacts involving geological hazards would not be significant under Alternative A. In combination with other past, present, and reasonably foreseeable projects, implementation of this alternative would have minor impacts related to geological hazards, mineral resources, and soils. Existing regulations and building practices would minimize potential adverse effects involving potential geological hazards on both an individual project basis and a cumulative basis.

Implementation of this alternative would contribute to increased erosion and sedimentation rates in the CTA study area and in downstream reaches of the ULVW; however, as indicated in the hydrologic modeling discussed in Section 4.3, "Water Resources," which looks at future conditions in the watershed, the cumulative effect is not expected to be significant.

Alternative B

As discussed under Alternative A, cumulative impacts involving geological hazards and mineral resources would not be significant under this alternative. Existing regulations and building practices

would minimize potential adverse effects involving potential geological hazards on both an individual project basis and a cumulative basis.

Implementation of this alternative would contribute to increased erosion and sedimentation rates in the CTA study area and in downstream reaches of the ULVW. Mitigation described below would address project-specific impacts, as well as cumulative erosion and sedimentation issues.

Alternative C

As discussed under Alternative A, cumulative impacts involving geological hazards would not be significant under this alternative. Existing regulations and building practices would minimize potential adverse effects involving potential geological hazards on both an individual project basis and a cumulative basis.

Implementation of this alternative would contribute to increased erosion and sedimentation rates in the CTA study area and in downstream reaches of the ULVW. Mitigation below would address project-specific impacts, as well as cumulative erosion and sedimentation issues.

Alternative D

As discussed under Alternative A, cumulative impacts involving geological hazards would not be significant under this alternative. Existing regulations and building practices would minimize potential adverse effects involving potential geological hazards both on an individual project basis and on a cumulative basis.

Implementation of this alternative would contribute to increased erosion and sedimentation rates in the CTA study area and in downstream reaches of the ULVW. Mitigation described below would address project-specific impacts, as well as cumulative erosion and sedimentation issues.

Alternative E

As discussed under Alternative A, cumulative impacts involving geological hazards would not be significant under this alternative. Existing regulations and building practices would minimize potential adverse effects involving potential geological hazards on both an individual project basis and a cumulative basis.

Implementation of this alternative would contribute to increased erosion and sedimentation rates in the CTA study area and in downstream reaches of the ULVW. Mitigation described below would address project-specific impacts, as well as cumulative erosion and sedimentation issues.

No Action

As discussed under Alternative A, cumulative impacts involving geological hazards would not be significant under this alternative. Existing regulations and building practices would minimize potential adverse effects involving potential geological hazards on both an individual project basis and a cumulative basis.

Implementation of this alternative would have the greatest contribution to increased erosion and sedimentation rates in the CTA study area and in downstream reaches of the ULVW. Mitigation described below would address project-specific impacts, as well as cumulative erosion and sedimentation issues.

4.14.2 Water Resources

In consideration of past, present, and reasonably foreseeable projects, the actions common to all of the alternatives would not have cumulatively significant impacts to surface water, groundwater, or water supply and demand. Surface and stream bank erosion and the 100-year floodplain are expected to remain similar to baseline conditions of the CTA.

Existing regulations pertaining to hazardous materials and water quality would minimize any individually or cumulatively significant adverse impacts resulting from the presence of an REC and the construction of new road alignments and utilities. Because no wells are proposed under any of the alternatives and there is little potential to encounter groundwater during construction activities within the disposed parcels, impacts to groundwater levels would not be cumulatively significant.

Alternative A

In consideration of past, present, and reasonably foreseeable projects, Alternative A would not have cumulatively significant impacts to surface water or groundwater. The amount of sediment loss resulting from surface and stream bank erosion is expected to mirror current conditions within the CTA study limits, and the 100-year floodplain and existing drainage would not be altered with the implementation of this alternative. As a result, no new flood control facilities or erosion control measures would be required under this alternative.

Existing regulations pertaining to hazardous materials and water quality would minimize any individually or cumulatively significant adverse impacts resulting from development within the disposed parcels. Because no wells are proposed under Alternative A and there is little potential to encounter groundwater during construction activities within the disposed parcels, impacts to groundwater levels would not be cumulatively significant.

Implementation of Alternative A would result in an incremental increase in water demand to accommodate development within the disposed parcels. Because the demand for water in the LVV continues to grow and supplies are uncertain, this increase, despite being minimal, could represent a cumulatively significant impact if SNWA cannot meet future projected water demands. SNWA, in cooperation with local municipalities, will continue its effort to achieve more rigorous conservation goals, will implement its *Drought Plan* (SNWA 2007), and will explore additional supply opportunities to help meet long-term demand within this region.

Alternative B

Cumulative impacts related to groundwater would not be significant for the same reasons as described under Alternative A. Implementation of the Preferred Alternative would result in an incremental increase in water demand to accommodate development of the disposed parcels. If the forecasted water shortfall cannot be met by the SNWA water portfolio (refer to Figure 3.3-2), the additional water requirements under the Preferred Alternative could contribute to a cumulative impact to water supply and demand. SNWA, in cooperation with local municipalities, will continue its effort to achieve more rigorous conservation goals, will implement its *Drought Plan* (SNWA 2007), and will explore additional supply opportunities to help meet long-term demands within this region.

Under the Preferred Alternative, stream bank erosion processes would increase incrementally within the CTA study area and in downstream reaches of the ULVW. The additional impervious surfaces and increased runoff from development would lead to a slightly larger floodplain, assuming no enlargement to

the existing flood control facilities or construction of new facilities. Mitigation measures would be required to reduce the cumulative erosion and hydrologic impacts.

Alternative C

Implementation of Alternative C would not have cumulatively significant impacts to groundwater for the same reasons as those described under Alternative A. In addition, the construction of a new detention basin within the CTA to address flood control needs would promote groundwater recharge. However, a new detention basin would alter existing flows and sediment transport within the wash, disrupting the natural flows and erosion processes. Existing regulations pertaining to hazardous materials and water quality would minimize any individually or cumulatively significant adverse impacts resulting from development within the disposed parcels.

Alternative C would result in an incremental increase in water demand to accommodate development within the disposed parcels. The increase represents a small percentage of future projected demands over the presumed 20-year build-out period. Because future water sources are undetermined, any increase in water requirements in the LVV could represent a cumulatively significant impact if SNWA cannot meet its projected demands. SNWA will continue its effort to achieve more rigorous conservation goals, will implement its *Drought Plan* (SNWA 2007), and will explore additional supply opportunities to help meet long-term demands within this region.

Alternative D

Because no wells are proposed under Alternative D and there is little potential to encounter groundwater during construction activities within the disposed parcels, cumulative impacts to groundwater levels would not be significant under Alternative D. In addition, the construction of a detention basin within the CTA to address flood control needs would promote groundwater recharge.

Existing regulations pertaining to hazardous materials and water quality would minimize any individually or cumulatively significant adverse impacts resulting from development within the disposal parcels.

Under Alternative D, there would be an incremental increase in water demand to accommodate development of the disposed parcels. If the forecasted shortfall cannot be met by the SNWA water portfolio, the additional water demand required under Alternative D could represent a cumulatively significant impact to water supply and demand. SNWA, in cooperation with local municipalities, will continue its effort to achieve more rigorous conservation goals, will implement its *Drought Plan* (SNWA 2007), and will explore additional supply opportunities to help meet long-term demands within this region.

Implementation of Alternative D would contribute to cumulative erosion and sedimentation processes within the CTA study area and in downstream reaches of the ULVW. Mitigation measures would be required to reduce the magnitude of cumulative erosion and sedimentation impacts.

Alternative E

Implementation of Alternative E would not have cumulatively significant impacts to groundwater for the same reasons as those described under Alternative A. In addition, the construction of a detention basin within the CTA to address flood control needs would promote groundwater recharge. Existing regulations pertaining to hazardous materials and water quality would minimize any individually or cumulatively significant adverse impacts resulting from development within the disposal parcels.

Implementation of Alternative E would contribute to cumulative erosion and sedimentation processes within the CTA study area and in downstream reaches of the ULVW. Mitigation measures would be required in order to reduce the magnitude of cumulative erosion and sedimentation impacts.

Alternative E would result in an increase in water demand to accommodate development within the disposed parcels. The incremental increase represents a small percentage of future projected demands over the presumed 20-year build-out period. Because future water sources are undetermined, however, any increase in water requirements in the LVV could represent a cumulatively significant impact if SNWA cannot meet projected demands. SNWA, in cooperation with local municipalities, will continue its effort to achieve more rigorous conservation goals, will implement its *Drought Plan* (SNWA 2007), and will explore additional supply opportunities to help meet long-term demands within this region.

No Action

Because no wells are proposed under the No-Action Alternative and there is little potential to encounter groundwater during construction activities within the disposed parcels, impacts to groundwater levels would not be cumulatively significant. Existing regulations pertaining to hazardous materials and water quality would minimize any individually or cumulatively significant adverse impacts resulting from development within the disposal parcels.

The No-Action Alternative would result in an increase in water demand to accommodate development within the disposed parcels. If the forecasted shortfall cannot be met by the SNWA water portfolio, the additional water demand required under the No-Action Alternative could represent a cumulatively significant impact to water supply and demand. SNWA, in cooperation with local municipalities, will continue its effort to achieve more rigorous conservation goals, will implement its *Drought Plan* (SNWA 2007), and will explore additional supply opportunities to help meet long-term demands within this region.

Implementation of the No-Action Alternative would have a cumulatively significant impact to erosion and sedimentation within the CTA study area and in downstream reaches of the ULVW. Mitigation measures would be required in order to reduce the magnitude of cumulative erosion and sedimentation impacts.

4.14.3 Vegetation

Alternative A

The cumulative impact assessment area considered for general vegetation resources includes the CTA study area and adjacent northern LVV vegetation communities. The cumulative impact assessment area considered for sensitive plants includes all available species' habitat in the LVV. This section describes impacts to vegetation resources within their cumulative impact assessment area resulting from the combination of this project and unrelated past, present, and reasonably foreseeable future projects in the area. These past, present, and future actions were or will be analyzed on a site-specific basis to determine their impact to vegetation resources (see Table 4.14-1).

Past actions that have directly impacted vegetation resources in the cumulative impact assessment area boundary include housing and industrial development, the construction of flood control facilities and detention basins, and the development of transmission lines, which have resulted in vegetation removal and habitat fragmentation. Approximately 5,000 acres a year has been developed in the LVV from 1970 to 2003 (165,000 acres). The BLM estimates that past actions have removed up to 80% of known habitat for Las Vegas buckwheat and Las Vegas bearpoppy in the LVV (BLM 2004a). Designation of the 1.5-

million-acre DNWR adjacent to the CTA study area has resulted in the preservation of a large tract of vegetation resources.

Present actions that have resulted in adverse impacts from the direct removal and fragmentation of vegetation resources consist of private development on up to 1,200 acres in the vicinity of the CTA study area, development of up to 900 acres for the Clark County Shooting Park, and development of the 5-acre Grand Teton power substation. Beneficial impacts from restoration and enhancement activities on up to 300 acres are occurring from current projects in Eglington Preserve. Projects leading to these beneficial impacts have included fencing, signing, increased monitoring, weed removal, trash removal, and site-specific revegetation.

Future actions that may result in direct, adverse impacts to general vegetation from vegetation loss and habitat fragmentation are related primarily to private development and growth in the LVV. These actions include development of gas pipelines, water pipelines, solar power plants, and master-planned communities, including development on the Paiute Reservation. Based on the 5,000-acre-per-year historic development estimate, approximately 50,000 acres would be developed through 2018. Development of individual solar energy projects would result in the loss of large tracts of undeveloped land in southern Nevada outside the disposal boundary. Other actions consist of park improvements within the 680 acres of Floyd Lamb Park (City of Las Vegas 2007a). Park improvements are anticipated to have a beneficial impact by improving visitor and educational facilities.

New development under Alternative A, when added to past, present, and reasonably foreseeable future actions, consists of both temporary and permanent removal of vegetation and habitat fragmentation. Under this alternative, actions would contribute up to 133.7 acres of general vegetation removal, or less than 1% of the cumulative vegetation removed from past, present, and reasonably foreseeable future actions (up to 217,000 acres). Under this alternative, construction activities would not contribute to a cumulative loss of buckwheat and bearpoppy habitat. Additionally, the preservation of 12,952.5 acres under this alternative, when added to approximately 1,000 acres of other beneficial projects as well as the adjacent 1.5-million-acre DNWR, would contribute to maintaining a large, continuous tract of vegetation, including buckwheat and bearpoppy habitat, along the ULVW. This ensures that adequate habitat for these species would be preserved in the study area.

Alternative B

The impacts to vegetation and BLM special-status and State of Nevada protected plant species from past, present, and reasonably foreseeable future actions would be the same as those described under Alternative A. Cumulative impacts to vegetation under this alternative would be similar to those identified for Alternative A but would differ in terms of the amount of vegetation removed and the amount of land preserved.

The impacts of construction activities under Alternative B, when added to past, present, and reasonably foreseeable future actions, consist of both temporary and permanent removal of vegetation and habitat fragmentation. Under this alternative, impacts to buckwheat habitat would be mitigated and would not contribute to any cumulative loss of habitat; 3.7 acres of high potential bearpoppy habitat would be lost to development actions outside the alternative boundary. Additionally, the preservation of 10,686.4 acres, including buckwheat and bearpoppy habitat, under this alternative, when added to 1,000 acres of other beneficial projects as well as the 1.5-million-acre DNWR, would contribute to maintaining a continuous tract of vegetation along the ULVW and adjacent uplands. This large tract would contribute toward maintaining adequate habitat for these species in the study area.

Alternative C

The impacts to vegetation and BLM special-status and State of Nevada protected plant species from past, present, and reasonably foreseeable future actions would be the same as those described under Alternative A. Under this alternative, construction activities would contribute up to 573.0 acres of permanent general vegetation removal to cumulative impacts. Additionally, private development on lands outside the alternative boundary would contribute up to 7,260.4 acres of permanent general vegetation removal to cumulative impacts. This loss of vegetation and fragmentation of habitat would be an adverse impact and would contribute 4% to a cumulative loss of up to 224,800 acres of vegetation habitat. The preservation of 5,789.3 acres under this alternative, when added to 1,000 acres of other beneficial projects, would contribute toward maintaining a continuous tract of vegetation along the ULVW but not adjacent uplands. The Alternative C boundary would not be directly adjacent to the 1.5-million-acre DNWR.

Under this alternative, 2.0 acres of moderate potential buckwheat habitat would be removed as a result of development actions outside the alternative boundary and 7.1 acres of high potential bearpoppy habitat would be lost to development actions outside the alternative boundary. This loss of habitat would be an adverse impact and would contribute to a cumulative loss of more than 80% of known buckwheat and bearpoppy habitat.

Alternative D

The impacts to vegetation and BLM special-status and State of Nevada protected plant species from past, present, and reasonably foreseeable future actions would be the same as those described under Alternative A. The loss of vegetation and fragmentation of habitat would be an adverse impact and would contribute more than 4% to a cumulative loss of more than 225,755 acres of vegetation habitat. The preservation of 4,668.5 acres under this alternative, when added to the 1,000 acres of other beneficial projects, would contribute to the preservation and enhancement of tracts of vegetation along the ULVW but not to adjacent uplands. The Alternative D boundary would not be adjacent to the 1.5-million-acre DNWR.

Under this alternative, 1.3 acres of moderate-potential buckwheat habitat would be removed as a result of development actions outside the alternative boundary, and 3.2 acres of high-potential bearpoppy habitat would be lost to development actions outside the alternative boundary. This loss of habitat would be an adverse impact and would contribute to a cumulative loss of more than 80% of known buckwheat and bearpoppy habitat.

Alternative E

The impacts to vegetation and BLM special-status and State of Nevada protected plant species from past, present, and reasonably foreseeable future actions would be the same as those described under Alternative A. The impacts of new development under Alternative E, when added to past, present, and reasonably foreseeable future actions, would be similar to those described under Alternative C and would consist of both temporary and permanent removal of vegetation and habitat fragmentation. This loss of vegetation and fragmentation of habitat would be an adverse impact and would contribute 5% to a cumulative loss of 227,445 acres of vegetation habitat. The preservation of 2,978.8 acres under this alternative, when added to other beneficial projects, would be a minor contribution to the preservation of vegetation within the active portions of the ULVW but not to adjacent uplands. Because the alternative boundary is not continuous, acres preserved would contribute to the fragmentation of vegetation communities along the ULVW.

Under this alternative, 32.7 acres of moderate-potential and 3.1 acres of high-potential buckwheat habitat would be removed as a result of development actions outside the alternative boundary, and 684.9 acres of moderate-potential and 3.2 acres of high-potential bearpoppy habitat would be lost to development

actions outside the alternative boundary. This loss of habitat would be an adverse impact and would be a significant contribution to cumulative losses of more than 85% of known buckwheat and bearpoppy habitat.

No Action

The impacts to vegetation and BLM special-status and State of Nevada protected plant species from past, present, and reasonably foreseeable future actions would be the same as those described under Alternative A. The impacts of private development to lands outside the No-Action boundary, when added to past, present, and reasonably foreseeable future actions, would consist of the permanent removal of vegetation and habitat fragmentation. Under the No-Action Alternative, private development on lands outside the alternative boundary would contribute up to 12,174.5 acres of general vegetation removal to cumulative impacts. This loss of vegetation and fragmentation of habitat would be an adverse impact and would contribute 5% to cumulative losses of more than 229,275 acres of vegetation habitat. The preservation of 1,448.2 acres under this alternative, when added to the 1,000 acres of other beneficial projects, would not contribute to the preservation of vegetation within the active portions of the ULVW, nor to adjacent uplands.

Under this alternative, 0.7 acre of occupied, 3.1 acres of moderate-potential, and 3.6 acres of high-potential buckwheat habitat would be removed as a result of development actions outside the alternative boundary, and 1,250.0 acres of potential and 285 acres of occupied bearpoppy habitat would be lost to development actions outside Eglington Preserve and Tule Springs. This loss of habitat would be an adverse impact and would be a significant contribution to cumulative losses of approximately 90% of known habitat for both species.

4.14.4 Cultural Resources

The cumulative impact assessment area considered for cultural resources includes the CTA study area and areas immediately adjacent to the study area boundary. This section describes impacts to cultural resources within the cumulative impact assessment area resulting from the combination of this project with unrelated past, present, and reasonably foreseeable future projects in the area. These past, present, and future actions were or will be analyzed on a site-specific basis to determine their impact to cultural resources (see Table 4.14-1).

Past actions that have had direct and indirect adverse impacts to cultural resources in the cumulative impact assessment area boundary include housing and industrial development, the construction of flood control facilities and detention basins, and the development of transmission lines, which have resulted in direct surface and subsurface disturbances. There were 117 previously recorded sites on BLM land within the disposal boundary prior to a 2004 field survey. Additionally, undocumented cultural resources likely occur on both private lands within the disposal boundary and around the perimeter of the disposal boundary. Approximately 5,000 acres a year have been developed in LVV from 1970 to 2003 (165,000 acres).

Present actions that have resulted in the loss of documented and undocumented cultural resources consist of private development on up to 1,200 acres in the vicinity of the CTA study area and development of up to 900 acres for the Clark County Shooting Park.

Future actions that may result in direct, adverse impacts to cultural resources are related primarily to private development and growth in the LVV. These actions include development of gas pipelines, water pipelines, solar power plants, and master-planned communities, including development on the Paiute Reservation. Based on the 5,000-acre-per-year historic development estimate, approximately 50,000 acres

would be developed through 2018. Development of individual solar energy projects would result in the loss of large tracts of undeveloped land in southern Nevada outside the disposal boundary (the acreage of these areas is unknown at this time).

The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, consist of both direct and indirect adverse impacts to cultural resources. Construction activities that would occur under all alternatives would contribute to increased public visitation and use, which may result in trampling, illegal collection, trash dumping, vandalism, and digging at undocumented sites.

Alternative A

The impacts to cultural resources from past, present, and reasonably foreseeable future actions would be the same as those described under "Actions Common to all Alternatives." The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, would consist of the loss of undocumented resources as a result of development and the loss of resource quality from increased public visitation, trampling, digging, dumping, and vandalism. The direct loss of cultural resources and resource quality would be an adverse impact and would contribute to the cumulative loss of cultural resources on up to 217,100 acres.

The preservation of 12,952.5 acres under this alternative, when added to the 300 acres preserved at Eglington Preserve and the 1.5 million acres of the DNWR, would contribute to the protection of undocumented cultural resources in a large block extending north of the LVV.

Alternative B

The impacts to cultural resources from past, present, and reasonably foreseeable future actions would be the same as those described under "Actions Common to all Alternatives." The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, would consist of the loss of undocumented resources as a result of development and the loss of resource quality from increased public visitation, trampling, digging, dumping, and vandalism. The direct loss of cultural resources and resource quality would be an adverse impact and would contribute to the cumulative loss of cultural resources on up to 219,400 acres.

The preservation of 10,495.6 acres under this alternative, when added to the 300-acre Eglington Preserve and 1.5-million-acre DNWR, would contribute to the preservation of undocumented cultural resources in a large block extending north of the LVV.

Alternative C

The impacts to cultural resources from past, present, and reasonably foreseeable future actions would be the same as those described under "Actions Common to all Alternatives." The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, would consist of the loss of undocumented resources as a result of construction activities associated with private development and the loss of resource quality from increased public visitation, trampling, digging, dumping, and vandalism. The direct loss of cultural resources and resource quality would be an adverse impact and would contribute to the cumulative loss of cultural resources on up to 224,360 acres.

The preservation of 6,362.3 acres under this alternative would contribute to the preservation of undocumented cultural resources along the ULVW but would not decrease the cumulative adverse impacts of increased private development surrounding the alternative boundary.

Alternative D

The impacts to cultural resources from past, present, and reasonably foreseeable future actions would be the same as those described under "Actions Common to all Alternatives." The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, would consist of the loss of undocumented resources as a result of construction activities associated with private development and the loss of resource quality from increased public visitation, trampling, digging, dumping, and vandalism. The direct loss of cultural resources and resource quality would be an adverse impact and would contribute to the cumulative loss of cultural resources on up to 225,421 acres.

The preservation of 5,301.4 acres under this alternative would contribute to the protection of undocumented cultural resources along the ULVW but would not decrease the cumulative adverse impacts of increased private development surrounding the alternative boundary.

Alternative E

The impacts to cultural resources from past, present, and reasonably foreseeable future actions would be the same as those described under "Actions Common to all Alternatives." The adverse impacts of increased private development surrounding the alternative boundary, when added to past, present, and reasonably foreseeable future actions, would consist of the loss of undocumented cultural resources as a result of construction activities associated with private development and the loss of resource quality from increased public visitation, trampling, digging, dumping, and vandalism. The direct loss of cultural resources and resource quality would be an adverse impact and would contribute to the cumulative loss of cultural resources on up to 227,110 acres.

The preservation of 3,313.8 acres under this alternative would contribute to the preservation of undocumented cultural resources along the ULVW but would not decrease the cumulative adverse impacts of increased private development surrounding the alternative boundary.

No Action

The impacts to cultural resources from past, present, and reasonably foreseeable future actions would be the same as those described under the actions common to all alternatives. The adverse impacts of increased private development surrounding the alternative boundary, when added to past, present, and reasonably foreseeable future actions, would consist of the loss of undocumented cultural resources as a result of construction activities associated with private development and the loss of resource quality from increased public visitation, trampling, digging, dumping, and vandalism. The direct loss of cultural resources and resource quality would be an adverse impact and would contribute to the cumulative loss of cultural resources on up to 229,250 acres.

The preservation of 1,448.2 acres under this alternative would not contribute to the cumulative preservation of known or undocumented cultural resources along the ULVW.

4.14.5 Traditional Cultural Properties

Cumulative impacts may include increases in pollution resulting from additional vehicle traffic in the vicinity of the LVW or from an increase in litter from additional visitors (e.g., objects thrown from vehicle windows), which may subsequently impact the resources of the LVW. Easier access to the ULVW could result in unintended increases in OHV use, which could affect other resources, such as

sensitive plants or sacred places, thus adversely affecting the serenity and cultural experience that is so important for tribal members who use the area.

4.14.6 Paleontology

Cumulative impacts can result from incrementally minor but collectively significant actions taking place over a period of time. The incremental loss of paleontological resources over time as a result of hydrologically or construction-related surface disturbance, vandalism, and unlawful collection would represent a significant cumulative adverse impact because it would result in the destruction of non-renewable paleontological resources and the associated irretrievable loss of scientific information regarding the paleoecology and paleoenvironments of the ULVW during the Pleistocene. The size of the CTA correlates directly with cumulative impacts to paleontological resources. The greater the area of the LVF and number of known fossil localities that are preserved within the CTA, the lower the amount of cumulative impacts in terms of the loss to science and society of the fossils and associated information.

Alternative A

The cumulative impact assessment area considered for paleontological resources includes the LVF. This section describes impacts to paleontological resources within the cumulative impact assessment area resulting from the combination of this project with unrelated past, present, and reasonably foreseeable future projects in the area. Although it is unknown how many paleontological sites have been impacted by past development in the LVV, future actions will be analyzed on a site-specific basis to determine their impact to resources (see Table 4.14-1).

Past actions that have directly impacted paleontological resources in the LVF include housing and industrial development, the construction of flood control facilities and detention basins, and development of transmission lines and roads, which have resulted in surface and subsurface disturbances.

Present actions that have resulted in adverse impacts from the direct disturbance of acreage in the LVF consist of development of access and infrastructure for the Clark County Shooting Park. Future actions that may result in direct, adverse impacts to paleontological resources are related primarily to private development and growth in the LVV. These actions include development of gas pipelines, water pipelines, and master-planned communities, including development on the Paiute Reservation. Other actions consist of park improvements within the 680 acres of Floyd Lamb Park (City of Las Vegas 2007a). Park improvements are anticipated to have a beneficial impact by improving visitor and educational facilities related to the fossil resources present in the area.

The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, would result in a minor contribution to cumulative impacts to undocumented paleontological resources. Impacts from construction activities would be mitigated. Additionally, the preservation of 12,952.5 acres under this alternative would contribute to the overall preservation of all 436 known and undocumented paleontological resources throughout the LVF.

Alternative B

Impacts to paleontological resources from past, present, and reasonably foreseeable future actions would be the same as those under Alternative A. Cumulative impacts to impacts to paleontological resources under this alternative would be greater than under Alternative A yet would not be as severe as under the other alternatives, which preserve less land and provide less of a buffer for the LVF within the CTA.

The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, would contribute to a greater loss of undocumented fossil localities as a result of surface-disturbing construction activities. Additionally, new recreation use and greater private development density surrounding the LVF would contribute to cumulative indirect impacts to fossils in the form of illegal collection, vandalism, and trampling.

The preservation of 10,686.4 acres, including all known fossil localities, under this alternative would contribute to the preservation of paleontological resources in the LVF. This would result in the long-term protection and interpretation of fossil resources present in the LVF.

Alternative C

Impacts to paleontological resources from past, present, and reasonably foreseeable future actions would be the same as those under Alternative A. The preservation of 6,362.3 acres does not include all known fossil localities under this alternative. Cumulative impacts to impacts to paleontological resources under this alternative would be greater than under Alternative A yet would not be as severe as under the other alternatives, which preserve less land and provide less of a buffer for the LVF within the CTA.

The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, would contribute to the loss of undocumented fossil localities as a result of subsurface-disturbing construction activities.

Alternative D

Impacts to paleontological resources from past, present, and reasonably foreseeable future actions would be the same as those under Alternative A. The preservation of 5,301.4 acres does not include all known fossil localities under this alternative. Cumulative impacts to paleontological resources under this alternative would be greater than under Alternative A yet would not be as severe as under the other alternatives, which preserve less land and provide less of a buffer for the LVF within the CTA.

The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, consist of the loss of known and undocumented fossil localities as a result of surface-disturbing construction activities. Additionally, the increase in allowable private development surrounding the LVF would contribute to greater adverse indirect impacts to fossils in the form of illegal collection, vandalism, and trampling. New development would contribute cumulatively to significant adverse impacts from the loss of paleontological resources in the LVF.

Alternative E

Impacts to paleontological resources from past, present, and reasonably foreseeable future actions would be the same as those under Alternative A. The preservation of 3,313.8 acres does not include all known fossil localities under this alternative. Up to 118 known fossil localities would be lost under this alternative. Cumulative impacts to paleontological resources under this alternative would be greater than under Alternative A yet would not be as severe as under the No-Action Alternative, which preserves less land and provides less of a buffer for the LVF within the CTA.

The impacts of private development under this alternative, when added to past, present, and reasonably foreseeable future actions, would contribute to the loss of 118 known fossil localities and the loss of undocumented fossil localities as a result of surface-disturbing construction activities. Additionally, the increase in private development surrounding the LVF would contribute to greater indirect, adverse impacts to fossils in the form of illegal collection, vandalism, and trampling. New development would

contribute cumulatively to significant adverse impacts from the loss of paleontological resources in the LVF.

No Action

The impacts to paleontological resources from past, present, and reasonably foreseeable future actions would be the same as those under Alternative A. Cumulative impacts to paleontological resources under this alternative would be the greatest of all the alternatives because it would preserve the smallest acreage of LVF and smallest number of known fossil localities within the CTA. The preservation of 1,448.2 acres does not include all known fossil localities under this alternative. Under this alternative, there would be no contribution to the long-term protection and interpretation of fossil resources present in the LVF.

The impacts of private development under this alternative, when added to past, present, and reasonably foreseeable future actions, consist of the loss of 354 known fossil localities and the loss of undocumented fossil localities as a result of surface-disturbing construction activities. The largest increase in private development surrounding and overlapping the LVF and Tule Springs would contribute to greater indirect, adverse impacts to fossils in the form of illegal collection, vandalism, and trampling. These actions would contribute cumulatively to significant adverse impacts from the loss of paleontological resources in the LVF.

4.14.7 Visual Resources

Alternative A

To determine the cumulative effect of the alternatives of this SEIS on the visual resources, or landscapes, of public lands in the CTA, the analysis assumes that lands made available for disposal under each alternative would go into private ownership and potentially be developed as part of the growth of the Cities of Las Vegas and North Las Vegas. As disclosed above, lands that transfer into private ownership would be expected to be developed to a degree that will transform a predominantly natural or undeveloped setting into an urban setting composed of residential areas, commercial business, light industrial development, public facilities, and parks. Other development in and adjacent to the LVV would also contribute to the urban development of lands in and adjacent to the valley.

The LVVDB FEIS (BLM 2004a) assumed that about 5,000 acres of public lands would be sold by BLM for the growth of the valley and would be developed per year through 2018. Thus by 2018, an additional 50,000 acres would have been sold and developed. Following that assumption, this alternative would contribute cumulatively 370.8 acres (or < 1%) to that ultimate disposal and anticipated development of public lands in and adjacent to the valley and the conversion of a mostly undeveloped landscape to an urban landscape.

Alternative B

The disposal and potential development of public lands outside the CTA under Alternative B would have cumulative effects on the landscape that are similar to those described under Alternative A but on 2,827.5 acres, or about 5% of public lands in and adjacent to the LVV.

Alternative C

The disposal and potential development of public lands outside the CTA under Alternative C would have cumulative effects on the landscape that are similar to those described under Alternative A but on 6,960.9 acres, or about 14% of public lands in and adjacent to the entire LVV.

Alternative D

The disposal and potential development of public lands outside the CTA under Alternative D would have cumulative effects on the landscape that are similar to those described under Alternative A but on 8,022.7 acres, or about 16% of public lands in and adjacent to the entire LVV.

Alternative E

The disposal and potential development of public lands outside the CTA under Alternative E would have cumulative effects on the landscape that are similar to those described under Alternative A, but on 10,010.3 acres, or about 20% of public lands in and adjacent to the entire LVV.

No Action

The disposal and potential development of public lands outside the CTA under the No-Action Alternative would have cumulative effects on the landscape that are similar to those described under Alternative A but on 12,174.5 acres, or about 24% of public lands in and adjacent to the entire LVV.

4.14.8 Land Uses

Alternative A

The SNPLMA, as amended by the Clark County Act, authorized BLM to dispose of about 74,000 acres of public land in the LVV for the growth of communities in the valley (BLM 2004a). Many lands have already been sold or made available for public purposes through the R&PP Act, and the LVVDB FEIS (BLM 2004a) authorized the sale of the remaining 46,701 acres. Other development in and adjacent to the LVV would also contribute to the use and development of lands in and adjacent to the LVV. The development includes stormwater runoff control structures, water pipelines, gas pipelines, electric transmission lines, parks, roads and parkways, utility corridors, solar energy development, and development on the Paiute Reservation (see Table 4.14-1). The LVVDB FEIS (BLM 2004a) assumed about 5,000 acres of public lands would be sold by BLM for the growth of the valley and would be developed per year through 2018. Thus, by 2018, an additional 50,000 acres would have been sold and developed. Following that assumption, this alternative would contribute cumulatively 370.8 acres (or < 1%) to that ultimate disposal and anticipated use of public lands in and adjacent to the LVV.

Local outdoor recreation areas in proximity to the LVV offer about 1,495,664 acres for a variety of recreation opportunities (BLM 1998a). These recreation areas include Red Rock Canyon NCA, Sloan Canyon NCA, Frenchman/Sunrise Mountain Natural Area, Nellis Dunes Recreation Area, DNWR, Spring Mountain NRA, Floyd Lamb Park, Spring Mountain Ranch State Park, and Lake Mead NRA. Development of the Clark County Shooting Park would add another 2,880 acres of outdoor recreation opportunities.

Alternative B

The cumulative impacts of disposal of public lands under Alternative B would have effects on development and land uses that are similar to those under Alternative A, but for 2,827.5 acres, or about 5% of public lands available for disposal in the LVV.

The cumulative effect of management of the CTA for recreation, education, and research would be similar to that described under Alternative A but for 10,495.6 acres, or 0.7% of the lands available for these uses in proximity to the LVV.

Alternative C

The cumulative impact of disposal of public lands under Alternative C would have effects on development and land uses that are similar to those under Alternative A but for 6,961.0 acres, or about 14% of public lands available for disposal in the LVV.

The cumulative effect of management of the CTA for recreation, education, and research would be similar to that under Alternative A but for 6,362.3 acres, or 0.4% of the lands available for these uses in proximity to the LVV.

Alternative D

The cumulative impact of disposal of public lands under Alternative D would have effects on development and land uses that are similar to those under Alternative A but for 8,022.7 acres, or about 16% of public lands available for disposal in the LVV.

The cumulative effect of management of the CTA for recreation, education, and research would be similar to that under Alternative A, but for 5,301.4 acres, or 0.4% of the lands available for these uses in proximity to the LVV.

Alternative E

The cumulative impact of disposal of public lands under Alternative E would have effects on development and land uses that are similar to those under Alternative A but for 10,010.3 acres, or about 20% of public lands available for disposal in the LVV.

The cumulative effect of management of the CTA for recreation, education, and research would similar to that under Alternative A, but for 3,313.8 acres, or 0.2% of the lands available for these uses in proximity to the LVV.

No Action

The cumulative impact of disposal of public lands under the No-Action Alternative would have effects on development and land uses that are similar to those under Alternative A but for 12,174.5 acres, or about 24% of public lands available for disposal in the LVV.

The cumulative effect of management of the CTA for recreation, education, and research would similar to that under Alternative A but for 1,448.2 acres, or 0.1% of the lands available for these uses in proximity to the LVV.

4.14.9 Recreation

Alternative A

The cumulative impact assessment area considered for recreation includes the CTA study area, LVV, and areas surrounding the LVV. This section describes impacts to recreation resources within the cumulative impact assessment area resulting from the combination of this project with unrelated past, present, and reasonably foreseeable future projects in the area. These past, present, and future actions were or will be analyzed on a site-specific basis to determine their impact to vegetation resources (see Table 4.14-1).

Past actions that have directly impacted recreation resources in the cumulative impact assessment area boundary include housing and industrial development, the construction of flood control facilities and detention basins, and the development of transmission lines, which have resulted in a loss of access and changes to recreational opportunities. Approximately 5,000 acres per year were developed in the LVV between 1970 and 2003 (165,000 acres). The designation of the 1.5-million-acre DNWR adjacent to the study area, Red Rock Canyon NCA, Lake Mead NRA, and state and local parks has, at the same time, resulted in greater urban recreation opportunities within the LVV and the availability of large areas of land surrounding the LVV that provide diverse recreation opportunities.

Present actions that have resulted in adverse impacts from the direct removal of lands available for recreation consist of private development on up to 1,200 acres in the vicinity of the CTA study area. Increased, diverse recreation opportunities would result from the development of the Clark County Shooting Park. The Clark County Shooting Park, to be located north of the Urban Interface Zone, would contribute to indirect, beneficial cumulative impacts to recreation by adding to the diverse range of recreation opportunities for residents and visitors to the LVV. In addition, the development of Floyd Lamb State Park as a regional park with sports fields, playgrounds, visitors' centers, and other amenities would add cumulatively to the diversity of recreation opportunities available in the LVV.

Future actions that may result in direct, adverse impacts from the loss of recreation resources and opportunities are related primarily to private development and growth in the LVV. These actions include development of gas pipelines, water pipelines, solar power plants, and master-planned communities, including development on the Paiute Reservation. Based on the 5,000-acre-per-year historic development estimate, approximately 50,000 acres would be developed through 2018. Development of individual solar energy projects would result in the loss of large tracts of undeveloped land in southern Nevada outside the disposal boundary. Beneficial impacts from other future actions consist of park improvements within the 680 acres of Floyd Lamb Park (City of Las Vegas 2007a). Park improvements are anticipated to have a beneficial impact by adding to and improving existing recreational facilities.

The impacts of land preservation and new development under Alternative A, when added to past, present, and reasonably foreseeable future actions, would contribute to new recreation opportunities within the LVV. The preservation of 12,952.5 acres under this alternative and the new development, when added to the lands managed as the DNWR, Red Rock Canyon, Lake Mead, and state and local parks throughout the LVV, would contribute to the diverse amount of recreation opportunities provided in the study area.

Alternative B

The impacts to recreation from past, present, and reasonably foreseeable future actions would be the same as those described under Alternative A. Cumulative impacts to recreation under this alternative would be similar to those under Alternative A but would differ in terms of the amount of new trails provided and the amount of land preserved.

The impacts of land preservation and new development under this alternative, when added to past, present, and reasonably foreseeable future actions, would contribute to new recreation opportunities within the LVV. The preservation of up to 10,495.6 acres under this alternative and the new development, when added to the lands managed as the DNWR, Red Rock Canyon, Lake Mead, and state and local parks throughout the LVV, would contribute to the diverse amount of recreation opportunities provided in the study area.

Alternative C

The impacts to recreation from past, present, and reasonably foreseeable future actions would be the same as those under Alternative A. Cumulative impacts to recreation under this alternative would be similar to

those under Alternative A but would differ in terms of the amount of new development and the amount of land preserved.

The increase in intensity of adjacent land uses, along with increased access to the CTA, could contribute cumulatively to a decrease in the perceived value of the resources within the area. The loss of natural landscapes as a result of the increased development within and adjacent to CTA boundaries could lead to a decrease in recreation opportunities for enjoying natural settings.

Alternative D

The impacts to recreation from past, present, and reasonably foreseeable future actions would be the same as those under Alternative A. Cumulative impacts to recreation under this alternative would be similar to those under Alternative A but would differ in terms of the amount of new development and the amount of land preserved. Only 5,301 acres would be preserved under this alternative, and the total amount of trails would be reduced to approximately 5 miles.

The increase in development and intensity of adjacent land uses, along with greater access to a smaller CTA, could contribute cumulatively to a decrease in the perceived value of the resources within the area. The loss of the natural landscape as a result of the increased development within and adjacent to CTA boundaries could lead to a decrease in the perceived value of important resources.

Alternative E

Under Alternative E, cumulative impacts would be similar to those under Alternative D. An overall increase in adverse cumulative impacts would result from the reduction in protected acreage within the CTA as well as the change in focus from protection of natural resources to assurance that private development opportunities would be made available with the implementation of established mitigation measures.

No Action

As populations within the Cities of Las Vegas and North Las Vegas continue to increase, the demand for a wide variety of active and passive recreation opportunities within the LVV may also increase. A significant adverse cumulative impact to existing and potential future recreation areas adjacent to and within the CTA boundaries may result from an incremental increase in visitorship to those areas over time and a lack of available resources to accommodate growing numbers. A subsequent overuse of existing amenities and natural resources may occur, leading to a reduction in the value of resources and less appreciation and enjoyment of the area by potential visitors.

4.14.10 Transportation

Alternative A

The area considered for cumulative impacts to transportation includes the CTA study area and adjacent lands in the northern LVV. This cumulative impacts section describes impacts to transportation within that area that would result from the combination of this alternative with past, present, and reasonably foreseeable future projects in the area.

Past actions include private development and expansion of transportation infrastructure, including the 215 Beltway, throughout the northern LVV. Beneficial impacts to transportation infrastructure from present actions include widening and paving existing roads in areas adjacent to the CTA study area. Adverse

impacts to transportation from present actions include increasing daily traffic and a reduction in access to public lands resulting from land disposal and private development adjacent to the CTA study area.

Direct, adverse impacts to transportation are anticipated to continue from population growth throughout the LVV, additional land disposals, private development, and development of the Clark County Shooting Park. For the purposes of this study, increases in population are projected to range from 1.4% to 5.3% annually over a 20-year period (see Section 4.13.1, "Analysis Approach and Assumptions"). In the long term, recent population forecasts indicate that by 2030, the LVV will support a population almost double its current size. This growth will result in an increased traffic volume and congestion on LVV roadways (RTC 2008). The potential planned developments within the Paiute Reservation and Kyle Canyon Gateway would result in increased populations and traffic volume on U.S. Highway 95 in areas adjacent to the CTA study area. The Kyle Canyon Gateway project has been projected to include up to 16,000 residential units. Clark County has estimated 225,000 annual visits to the County Shooting Park (Clark County 2007). These actions would result in cumulative adverse impacts to transportation and traffic from increases in traffic volume relative to road capacity. Projected growth is expected to result in traffic congestion on U.S. Highway 95, Clark County 215, and Durango Drive, all with vehicle-to-capacity ratios exceeding one (City of Las Vegas 2008). The RTC of southern Nevada has developed a transportation plan to address an area that roughly coincides with the BLM disposal boundary through the year 2030. Components of the plan consider population growth projections and upgrades to major travel corridors and provide access and connectivity to developing areas in the LVV, including the proposed Sheep Mountain Parkway (RTC 2008). Cumulative adverse impacts would be mitigated in the long term through implementation of elements of the RTC transportation plan, including additional road capacity, roadway improvements, congestion management programs, expanded transit options, and alternative forms of transportation, such as pedestrian and bicycle (RTC 2008).

Alternative B

The impacts to transportation from past, present, and reasonably foreseeable future actions would be the same as those under "Actions Common to all Alternatives." The impacts of private development to 2,827.5 acres outside the alternative boundary, when added to past, present, and reasonably foreseeable future actions, would consist of adverse impacts to transportation and traffic from increases in traffic volume relative to road capacity similar to that described under Alternative A. The RTC of southern Nevada has developed a transportation plan to address an area that roughly coincides with the BLM disposal boundary through the year 2030. Components of the plan consider population growth projections and upgrades to major travel corridors and provide access and connectivity to developing areas in the LVV, including the proposed Sheep Mountain Parkway (RTC 2008). Cumulative adverse impacts would be mitigated in the long term through implementation of elements of the RTC transportation plan, including additional road capacity, roadway improvements, congestion management programs, expanded transit options, and alternative forms of transportation, such as pedestrian and bicycle (RTC 2008).

Alternative C

The impacts to transportation from past, present, and reasonably foreseeable future actions would be the same as those under "Actions Common to all Alternatives." The impacts of private development to 6,960.9 acres outside the alternative boundary, when added to past, present, and reasonably foreseeable future actions, would consist of adverse impacts to transportation and traffic from increases in traffic volume relative to road capacity. Future direct, adverse impacts to transportation and traffic are anticipated to occur from additional acreage available for disposal and private development. Population growth in the vicinity of the CTA would potentially be greater under this alternative. These actions would result in a cumulative increase in average annual daily traffic. The RTC of southern Nevada has developed a transportation plan to address an area that roughly coincides with the BLM disposal

boundary through the year 2030. Components of the plan consider population growth projections and upgrades to major travel corridors and provide access and connectivity to developing areas in the LVV, including the proposed Sheep Mountain Parkway (RTC 2008). Cumulative adverse impacts would be mitigated in the long term through implementation of elements of the RTC transportation plan, including additional road capacity, roadway improvements, congestion management programs, expanded transit options, and alternative forms of transportation, such as pedestrian and bicycle (RTC 2008).

Alternative D

The impacts to transportation from past, present, and reasonably foreseeable future actions would be the same as those under "Actions Common to all Alternatives." The impacts of private development to 8,022.7 acres outside the alternative boundary, when added to past, present, and reasonably foreseeable future actions, would consist of adverse impacts to transportation and traffic from increases in traffic volume relative to road capacity. Population growth in the vicinity of the CTA would potentially be greater under this alternative. This would result in a cumulative increase in average annual daily traffic. The RTC of southern Nevada has developed a transportation plan to address an area that roughly coincides with the BLM disposal boundary through the year 2030. Components of the plan consider population growth projections and upgrades to major travel corridors and provide access and connectivity to developing areas in the LVV, including the proposed Sheep Mountain Parkway (RTC 2008). Cumulative adverse impacts would be mitigated in the long term through implementation of elements of the RTC transportation plan, including additional road capacity, roadway improvements, congestion management programs, expanded transit options, and alternative forms of transportation, such as pedestrian and bicycle (RTC 2008).

Alternative E

The impacts to transportation from past, present, and reasonably foreseeable future actions would be the same as those under "Actions Common to all Alternatives." The impacts of private development to 10,010.3 acres outside the alternative boundary, when added to past, present, and reasonably foreseeable future actions, would consist of adverse impacts to transportation and traffic from increases in traffic volume relative to road capacity. Population growth and density in the vicinity of the CTA would be greater under this alternative. This would result in a cumulative increase in average annual daily traffic. The RTC of southern Nevada has developed a transportation plan to address an area that roughly coincides with the BLM disposal boundary through the year 2030. Components of the plan consider population growth projections and upgrades to major travel corridors and provide access and connectivity to developing areas in the LVV, including the proposed Sheep Mountain Parkway (RTC 2008). Cumulative adverse impacts would be mitigated in the long term through implementation of elements of the RTC transportation plan, including additional road capacity, roadway improvements, congestion management programs, expanded transit options, and alternative forms of transportation, such as pedestrian and bicycle (RTC 2008).

No Action

The impacts to transportation from past, present, and reasonably foreseeable future actions would be the same as those under "Actions Common to all Alternatives." The impacts of private development to 12,174.5 acres outside the alternative boundary, when added to past, present, and reasonably foreseeable future actions, would consist of adverse impacts to transportation and traffic from increases in traffic volume relative to road capacity. Population growth and density in the vicinity of the CTA would be the greatest under this alternative. This would result in a cumulative increase in average annual daily traffic.

4.14.11 Noise

Alternative A

The area considered for cumulative impacts to sensitive noise receptors includes the CTA study area and adjacent lands in the northern LVV. Under Alternative A, there would be no direct or indirect adverse impacts to sensitive noise receptors; thus, Alternative A would not contribute to cumulative impacts.

Alternative B

The area considered for cumulative impacts to sensitive noise receptors includes the CTA study area and adjacent lands in the northern LVV. This cumulative impacts section describes impacts to sensitive noise receptors within that area that would result from the combination of this alternative with past, present, and reasonably foreseeable future projects in the area. Past actions that have directly impacted sensitive noise receptors in the cumulative impact assessment area include housing and industrial development, the construction of flood control facilities and detention basins, and the development of transmission lines, which have resulted in short-term increases in ambient noise levels throughout the LVV. Adverse impacts to sensitive noise receptors from present actions include increased construction activities resulting from potential land disposal and private development adjacent to the CTA study area, as well as increased traffic.

Direct, adverse impacts to sensitive noise receptors are anticipated to continue from private development, population growth, and operation of the Clark County Shooting Park. Facilities in the shooting park would be located a minimum of 1 mile from sensitive noise receptors, including existing residential development adjacent to the CTA, and would result in a minor increase in ambient noise levels in the area immediately surrounding the shooting park. The potential planned developments within the Paiute Reservation and Kyle Canyon Gateway would result in increased ambient noise from residential development and motor vehicle traffic. Actions assumed for analysis would result in cumulative increases in ambient noise levels in the vicinity of construction areas.

All construction activities would occur in the short term and during daytime hours and would not exceed maximum allowable noise levels. The increases in ambient noise levels associated with new residential developments and traffic on existing roadways would not exceed the city noise ordinances or the county's maximum allowable noise levels. Cumulative impacts to sensitive noise receptors would not reach a level of significance.

Alternative C

The impacts to sensitive noise receptors from past, present, and reasonably foreseeable future actions would be the same as those under Alternative B. The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, consist of increased construction activities resulting from potential land disposal and private development adjacent to the CTA study area, as well as increased traffic.

Under this alternative, noise would occur in the short term from construction activities. Noise would also occur associated with the increased private development surrounding the alternative boundary. The cumulative increases in ambient noise levels associated with new development would not exceed the city noise ordinances or the county's maximum allowable noise levels.

Alternative D

The impacts to sensitive noise receptors from past, present, and reasonably foreseeable future actions would be the same as those under Alternative B. The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, consist of increased construction activities resulting from potential land disposal and private development adjacent to the CTA study area, as well as increased traffic.

Under this alternative, noise would occur in the short term from construction activities. Noise would also occur associated with the increased private development on up to 8,022.1 acres surrounding the alternative boundary. The cumulative increases in ambient noise levels associated with new development would not exceed the city noise ordinances or the county's maximum allowable noise levels.

Alternative E

The impacts to sensitive noise receptors from past, present, and reasonably foreseeable future actions would be the same as those under Alternative B. The impacts of greater private development, when added to past, present, and reasonably foreseeable future actions, would consist of increased construction activities resulting from potential land disposal and private development adjacent to the CTA study area.

Under this alternative, noise would occur in the short term from construction. Noise would also occur associated with the increased private development on up to 10,010.3 acres surrounding the alternative boundary. The cumulative increases in ambient noise levels associated with new development would not exceed the city noise ordinances or the county's maximum allowable noise levels.

No Action

The impacts to sensitive noise receptors from past, present, and reasonably foreseeable future actions would be the same as those under Alternative B. The impacts of new development under this alternative, when added to past, present, and reasonably foreseeable future actions, would consist of increased construction activities resulting from potential land disposal and private development adjacent to the CTA study area, as well as increased traffic.

Under this alternative, noise would occur in the short term from construction activities. Noise would also occur associated with the increased private development on 12,174.5 acres surrounding the alternative boundary. The cumulative increases in ambient noise levels associated with new development would not exceed the city noise ordinances or the county's maximum allowable noise levels.

4.14.12 Hazardous Materials

The actions common to all alternatives would not result in cumulatively significant impacts from hazardous materials. Because hazardous materials encountered from these actions would be mitigated on a case-by-case basis, cumulative impacts are not anticipated. Should hazardous materials be identified during implementation of any of the actions common to all alternatives, mitigation on a case-by-case basis would be considered to have a beneficial impact to the study area and its surroundings by eliminating the potential for the hazardous materials to adversely affect other resources.

Alternative A

In consideration of past, present, and reasonably foreseeable projects, Alternative A would not have cumulatively significant impacts from hazardous materials. Because hazardous materials encountered

under this alternative and potential impacts from other projects would be mitigated on a case-by-case basis, cumulative hazardous impacts would not be considered significant. Should hazardous materials be identified during implementation of any of the actions described above, mitigation on a case-by-case basis would be considered to have a beneficial impact to the study area and its surroundings by eliminating the potential for the hazardous materials to adversely affect other resources. Although minor amounts of hazardous materials may be located at facilities within these developed areas in the future, new facilities, including those within the CTA and others in the region, would be required to comply with hazardous material regulations to minimize potential impacts.

Alternative B

Cumulative impacts involving hazardous materials would not be significant for the same reasons as those described for Alternative A.

Alternative C

Cumulative impacts involving hazardous materials would not be significant for the same reasons as those described for Alternative A.

Alternative D

Cumulative impacts involving hazardous materials would not be significant for the same reasons as those described for Alternative A.

Alternative E

Cumulative impacts involving hazardous materials would not be significant for the same reasons as those described for Alternative A.

No Action

Cumulative impacts involving hazardous materials would not be significant for the same reasons as those described for Alternative A.

4.14.13 Socioeconomics

Alternative A

At present, Clark County and the Cities of Las Vegas and North Las Vegas are experiencing substantial population growth, which is expected to continue through 2025 (see Table 4.13-1). The nation, and certainly Nevada, is currently experiencing a downturn in the housing market. A lagging housing market can impact many aspects of the local economy by affecting the willingness of consumers to spend on discretionary purchases, such as automobiles and dining out. It is outside the scope of this project to forecast the expected trends of the local and national housing market based on anything other than historic data.

As developable land in the LVV diminishes, 370.8 acres of developable land from the CTA study area would not likely be sufficient to accommodate the needs of the Cities of Las Vegas and North Las Vegas for accommodating projected population growth and the subsequent need for public infrastructure, housing, and employment. Cumulatively, combined with the need for diversity of economic sectors and

job availability for current and potential future residents, Alternative A could result in an adverse impact to economic sectors, quality of life, and employment for the Cities of Las Vegas and North Las Vegas.

The disposal and development of lands in and adjacent to the CTA is itself considered cumulative. Between 1970 and 2003, an average of 5,000 acres per year has been developed in Clark County (BLM 2004a). Development of disposed lands within the CTA could add to cumulative impacts of lands outside but adjacent to the CTA. Cumulative impacts could include additional demands on public facilities and services, as well as utilities and infrastructure. Additionally, the displaced development that would potentially occur under the alternatives would contribute to increased costs associated with transportation and community services in the LVV. Should new developments move further from existing urbanized areas and employment opportunities in the LVV, there would be an increase in the economic costs associated with greater traffic congestion and commuting times (Entrix 2008). Beneficial impacts could also include increased construction spending, increased tax revenue, and employment opportunities in Clark County as those lands are developed in concert with the disposed lands within the CTA. Developed acreage could also contribute to a positive cumulative impact from increased revenues for adjacent facilities such as the future Clark County Shooting Park, Las Vegas Paiute developments, and other private entities within the area. Preservation of the 12,952.5 acres could add to the existing outdoor recreation opportunities in the LVV (see Section 4.8, "Land Use") and increase the amount of social amenities to residents of the area.

Alternative B

Cumulative impacts under Alternative B would be similar to those under Alternative A. Development of disposed lands within the CTA could add to cumulative impacts of lands outside but adjacent to the CTA. Cumulative impacts could include additional demands on public facilities and services, as well as utilities and infrastructure. Additional beneficial impacts could also include increased construction spending, increased tax revenue, and employment opportunities in Clark County as those lands are developed in concert with the 2,827.5 acres of disposed lands within the CTA. Developed acreage could also contribute to a positive cumulative impact from increased revenues for adjacent facilities such as the future Clark County Shooting Park, Las Vegas Paiute developments, and other private entities within the area. Preservation of the 10,495.60 acres could add to the existing outdoor recreation opportunities in the LVV (see Section 4.8, "Land Use") and increase the amount of social amenities to residents of the area; however, less land for recreation opportunities would be available than under Alternative A.

Alternative C

Under Alternative C, the increased availability of disposed acreage for development could contribute to a positive cumulative impact from increased revenues for adjacent facilities, such as the future Clark County Shooting Range, Las Vegas Paiute developments, and other private entities in the vicinity. Development of disposed lands within the CTA could add to cumulative impacts of developed lands outside but adjacent to the CTA. Cumulative impacts could include additional demands on public facilities and services, as well as utilities and infrastructure that must be accommodated by the Cities of Las Vegas and North Las Vegas. Additional beneficial impacts could also include increased construction spending, increased tax revenue, and employment opportunities in Clark County as those lands are developed in concert with the 6,960.9 acres of disposed lands within the CTA. Preservation of the 6,362.30 acres could add to the existing outdoor recreation opportunities in the LVV (see Section 4.8, "Land Use") and increase the amount of social amenities to residents of the area; however, less land for recreation opportunities would be available than under Alternatives A or B.

Alternative D

Development of disposed lands within the CTA could add to the cumulative impact of developed lands outside but adjacent to the CTA. Cumulative impacts could include additional demands on public facilities and services, as well as utilities and infrastructure that must be accommodated by the Cities of Las Vegas and North Las Vegas as the housing inventory and population increase in the region. As a result of increased development, additional beneficial impacts could also include increased construction spending, increased tax revenues, and employment opportunities in Clark County as land is developed in concert with the 8,022.7 acres of disposed lands within the CTA. Under Alternative D, more construction spending, tax revenue, and employment opportunities would result than if Alternatives A–C were implemented. Preservation of the 5,301.40 acres could add to the existing outdoor recreation opportunities in the LVV (see Section 4.8, "Land Use") and increase the amount of social amenities to residents of the area; however, less land for recreation opportunities would be available than under Alternatives A–C.

Alternative E

Under Alternative E, the increased availability of disposed acreage for development could contribute to a positive cumulative impact from increased revenues for adjacent facilities and other private entities in the vicinity. Development of disposed lands within the CTA could add to cumulative impacts of lands outside but adjacent to the CTA, such as additional demands on public facilities and services, as well as utilities and infrastructure. Additional beneficial impacts could cumulatively include increased construction spending, tax revenue, and employment opportunities in Clark County as lands are developed in concert with the 10,010.3 acres of disposed lands within the CTA; implementation of Alternative E would result in more cumulative economic impacts than Alternatives A–D. Preservation of the 3,313.80 acres could add to the existing outdoor recreation opportunities in the LVV (see Section 4.8, "Land Use") and increase the amount of social amenities to residents of the area; however, less land for recreation opportunities would be available than under Alternatives A–C.

No Action

Under the No-Action Alternative, cumulative impacts are expected to be similar to those under Alternative E, although to a greater degree, as there would be more land available for development and subsequent demands for infrastructure and employment to accommodate population growth in the area.

Of the six alternatives analyzed in this document, the No-Action Alternative provides for the most acreage (12,174.5 acres) to be disposed of and developed within the CTA. The cumulative development of these disposed lands, along with lands outside the CTA and within Clark County, could contribute to a positive cumulative impact from increased construction spending, tax revenue, and employment opportunities in the region. Development of disposed lands within the CTA, in addition to other private parcels, could also add to the potential for cumulative impacts, such as additional demands on public facilities and services, as well as utilities and infrastructure that must be accommodated by the Cities of Las Vegas and North Las Vegas. Municipalities would receive the most amount of tax revenue to fund infrastructure projects under the No-Action Alternative because implementation of this alternative would result in more cumulative economic impacts than under the five action alternatives. Preservation of the 1,448.20 acres could add to the existing outdoor recreation opportunities in the LVV (see Section 4.8, "Land Use") and increase the amount of social amenities to residents of the area; however, there would be fewer opportunities for recreation than under the five action alternatives.

Tables 4.14-2 and 4.14-3 present a summary of impacts and mitigation measures, respectively.

Table 4.14-2. Identified Significant Impacts that Cannot Be Mitigated below the Threshold of Significance, by Alternative

Resource	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	No-Action Alternative
Earth Resources	None	None	None	None	None	None
Water Resources	One REC was identified along the eastern boundary of the CTA study area. Because the nature of this REC is currently unknown, additional investigation is required to assess the function of the steel pipes and the presence of any potential hazardous materials. This could potentially be a significant adverse impact. Demand for water in the LVV continues to grow and supplies are uncertain; increased demand under this alternative, despite being minimal, could represent a cumulatively significant impact if SNWA cannot meet future projected water demands.	Same as Alternative A.	Same as Alternative A. Urban development, particularly on the bajada north of the ULVW, would require flood protection measures that have the potential to significantly alter the natural surface drainage processes within or near the ULVW. Likewise, land development would result in higher runoff peak flows and volumes as a result of impervious surfaces and would likely discharge into the ULVW in a concentrated manner at storm sewer outfalls.	Same as Alternative C.	Same as Alternative C.	Same as Alternative C.
Vegetation	None	A loss of 3.7 acres of high-potential bearpoppy habitat would occur from land disposal outside the alternative boundary, which would lead to significant adverse impacts to bearpoppy.	A loss of 7.1 acres of high-potential bearpoppy habitat would occur from land disposal outside the alternative boundary, which would lead to significant adverse impacts to bearpoppy.	A loss of 3.2 acres of high-potential bearpoppy habitat would occur from land disposal outside the CTA boundary, which would lead to significant adverse impacts to bearpoppy.	A loss of 684.9 acres of moderate-potential bearpoppy habitat and 3.2 acres of high-potential bearpoppy habitat would occur from land disposal outside the alternative boundary, which would lead to significant adverse impacts to bearpoppy.	Direct and indirect adverse impacts to Las Vegas buckwheat and bearpoppy would be significant. A loss of up to 220 acres of potential and 65 acres of occupied Las Vegas buckwheat habitat and 1,250 acres of potential and 285 acres of occupied bearpoppy habitat would occur from land disposal outside the alternative boundary.
Cultural Resources and Traditional Cultural Properties	None	None	Significant adverse impacts to TCPs and the traditional cultural landscape.	Significant adverse impacts to TCPs and the traditional cultural landscape.	Significant adverse impacts to TCPs and the traditional cultural landscape.	Significant adverse impacts to TCPs and the traditional cultural landscape.
Paleontological	None	None	None	The incremental loss of paleontological resources over time as a result of construction-related or hydrologic surface disturbance, vandalism, or unlawful collection would represent a significant cumulative adverse impact.	Same as Alternative D.	Same as Alternative D.
Visual	None	None	None	None	None	None
Land Use	None	None	None	None	None	None
Recreation	None	None	None	None	None	None
Transportation	None	None	None	None	None	None
Noise	None	None	None	None	None	None
Socioeconomics	A significant, direct, adverse impact to the Cities of Las Vegas and North Las Vegas, as well as utility groups, would likely occur, as less land would be made available for development and more restrictions on utility infrastructure would be put in place. A significant loss in community values for the cities could occur, as the desire to balance the need for development and more recreation opportunities for residents would not be realized. Utility groups would similarly be affected, as the need to accommodate current and future growth would come at greater economic cost, since redundant utility infrastructure would be required in order to sufficiently service residents of the Cities of Las Vegas and North Las Vegas.	Same as Alternative A.	None	None	Resource conservation groups and other stakeholders intent on maximum protection of the CTA study area would consider implementation of either Alternative E or the No-Action Alternative a significant adverse impact, given their community perceptions related to resource preservation and protection.	Same as Alternative E.
Hazardous Materials	None	None	None	None	None	None

Table 4.14-3. Identified Mitigation Measures by Alternative

Resource	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	No-Action Alternative
Earth Resources	No mitigation beyond standard construction practices is required.	The Cities of Las Vegas and North Las Vegas shall coordinate with CCRFCD to implement additional erosion and flood control measures required to address increased cumulative flood flows and erosion rates resulting from the development of lands disposed of by BLM.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
Water Resources	To address potential groundwater quality impacts associated with the REC described in Section 3.12, BLM will conduct an assessment of the site to determine whether hazardous materials exist within the study limits. If such materials are found to be present, BLM shall conduct remediation activities to remove the materials from the site. These actions shall occur prior to the disposal or leasing of the parcels.	Same as Alternative A. The Cities of Las Vegas and North Las Vegas shall coordinate with CCRFCD to implement additional erosion and flood control measures required to address increased cumulative flood flows and erosion rates resulting from the development of lands disposed of by BLM.	Same as Alternative A. The Cities of Las Vegas and North Las Vegas shall coordinate with CCRFCD to implement additional measures, as appropriate, to address higher peak flows and erosion mechanisms within ULVW.	Same as Alternative C.	Same as Alternative C.	Same as Alternative C.
Vegetation	**Significant Impacts Mitigation (see Appendix A)** **Prior to Project Construction** A. Mitigation banks or habitat conservation areas that contain both occupied and potential habitat for bearpoppy and Las Vegas buckwheat will be set up prior to construction actions. The mitigation bank should conserve habitat as well as fund transplant studies and other research. All moderate-potential habitat lost as a result of proposed actions greater than 10% would be mitigated by buying into the mitigation bank at a ratio of 1 acre:1 acre. All high-potential and occupied special-status plant habitat lost as a result of the proposed actions will be mitigated by buying into the mitigation bank at a ratio of 2 acres:1 acre, resulting in no unmitigated loss of potential sensitive plant habitat. B. Comprehensive plant surveys shall be conducted in potential and occupied habitat for all special-status plants during the blooming period immediately prior to construction activities. If individual(s) or areas with multiple individuals are observed, they will be documented (using a handheld global positioning system [GPS] unit) in accordance with BLM protocol, and an avoidance and impact minimization plan will be developed and implemented in coordination with BLM, NDF, and USFWS. Maps that depict the results of these surveys will be prepared that will include other recently mapped special-status plant occurrences in the area to ensure that the full scope of rare plant habitat associated with all the proposed construction is delineated. C. All individuals and populations of Las Vegas buckwheat and Merriam and Las Vegas bearpoppy within a construction area will be protected by being flagged with a buffer of 3 m (approximately 10 feet) by a BLM resource specialist or approved botanical contractor prior to surface-disturbing activities. This will protect root systems and seed banks and prevent plant damage. **During Construction** D. All individual special-status plants must be avoided by keeping construction activities outside flagged areas per Measure C. However, take of Merriam (white) bearpoppy may be allowed if it is necessary, but the species must be identified and a Take Permit must be obtained through NDF. If bearpoppies have not flowered and cannot be identified to species, no impacts will be allowed within any bearpoppy flagged areas. **Postconstruction** E. The amount of potential or occupied habitat of Las Vegas buckwheat, Las Vegas bearpoppy, and Merriam's bearpoppy will be monitored as part of the mitigation bank in Measure A. The total habitat removed for actions associated with a specific alternative cannot exceed the amount of loss analyzed for that alternative, which is reflected in the table of acres of habitat conserved that is established for each alternative. If an amount greater than the acres presented is affected, mitigation requirements should be re-evaluated.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 4.14-3. Identified Mitigation Measures by Alternative (Continued)

Resource	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	No-Action Alternative
Vegetation, continued	**General Impacts Mitigation** **Prior to Project Construction** A. A construction zone will be designated for vehicle and equipment travel, turnaround areas, stockpile areas, and vehicle service areas that use existing roads and disturbed areas, such as parking lots, as much as possible. Where construction needs to go into undisturbed areas, all areas to be disturbed will have boundaries flagged to minimize impacts to sensitive species and habitats, and all disturbances will be confined to the flagged areas. All employees will be instructed that their activities must be confined to locations within the flagged areas. B. A weed plan following BLM management practices will be developed for ground-disturbing activities. C. Equipment will be free of caked mud or debris and will be washed prior to entering and exiting the project site to avoid the introduction of noxious weeds. Weed monitoring shall occur for species identified by the State of Nevada as well as for additional species specified by Clark County during a given year. Such species constitute the official list of weeds for which a county may apply for cost-share funding for control and removal efforts. If such species are found during monitoring, control and eradication efforts shall be implemented following county control procedures. D. All topsoil in occupied habitat is potentially seed bearing. Topsoil in potential habitat will be evaluated by BLM resource specialists or contractors to determine its seed-bearing potential, and soils determined to be seed bearing will be flagged. During construction, topsoil in flagged areas will be removed to a depth of 2–4 inches (5–10 cm), stockpiled, and used for topsoil restoration following construction activities. **During Construction** E. Removal of desert wash habitat should be avoided and minimized to the greatest extent practicable. Where avoidance is not practicable, consultation with USACE, potentially leading to the issuance of a Section 404 CWA permit, should occur and mitigation strategies should be developed. F. Cacti and yucca species are protected by NDF under NRS 527.060–527.120 and are required to be salvaged based on requirements stipulated by the local BLM office. Salvaged plants will be used for revegetation of the project area or other disturbed areas or sent to a BLM stockpiling facility as directed by BLM. G. BLM-approved soil stabilization/dust control methods will be implemented. H. Oil, fuel, and other equipment fluid leaks will be cleaned up and properly disposed of in accordance with regulations. **Postconstruction** I. Disturbed areas will be stabilized with appropriate treatments immediately following project facility construction until the areas can be seeded with site-specific mix(es) during the next appropriate planting period (i.e., spring or fall). J. Disturbed natural vegetation communities will be seeded with BLM-approved seed mixes during the appropriate planting period (i.e., spring or fall).					Same as Alternative B.
Cultural Resources	Mitigation measures for all sites are being completed independent of any proposed action and will be completed by the end of 2008. All mitigation measures include the development of public interpretive and educational material. Mitigation measures for Sites 26Ck4803 and 26Ck6351 include historical survey and archival research, detailed recording of linear features and associated artifact concentrations, site mapping, surface recording, and creation of interpretive material that can later be used to produce an interpretive sign for the location. Detailed maps and drawings will be produced that identify site features, artifact concentrations, and topographic features. No surface artifacts will be collected. Mitigation measures for Site 26Ck5596 include historical and archival research, detailed recording of surface artifact concentrations, site mapping, and phased excavation of cultural features believed to be associated with the construction camp. A detailed map will be produced that identifies site features, artifact concentrations, and topographic features. No surface artifacts will be collected unless the artifact has additional data potential or intrinsic value. Artifacts recovered from excavation units with the potential to be ethnically or temporally diagnostic will be collected for further analysis.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Table 4.14-3. Identified Mitigation Measures by Alternative (Continued)

Resource	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	No-Action Alternative
Cultural Resources, continued	Mitigation measures for Site 26Ck6507 include historical survey, archival research, detailed recording of linear features and associated artifact concentrations, and site mapping. Detailed maps and drawings will be produced that identify site features, artifact concentrations, and topographic features. No surface artifacts will be collected. Mitigation measures for Site 26Ck6910 include surface collection, excavation, and laboratory analysis. Excavation will include three contiguous 1 × 1–m units placed to expose a profile of the hearth feature and develop a better understanding of the feature. Additional 1 × 1–m units will be excavated as needed to complete excavation of the feature, supplemented by up to six additional 1 × 1–m units leading away from the feature to assess whether buried evidence of other activity is present. Radiocarbon and luminescence dating will be conducted if suitable material is recovered. Artifact analysis will use the methods set forth in the HPTP (Cannon et al. 2008).					
Traditional Cultural Properties	Tribal representatives could be involved in the planning of recreational trails and infrastructure development to find the best possible routes, determine places to avoid or monitor for non-sanctioned use, and suggest other means to protect resources of traditional cultural association. Continued involvement of the Las Vegas Paiute Tribe in planning such developments and minimizing future impacts is the best mitigation measure under this alternative. Through ongoing consultation with the government of the Las Vegas Paiute Tribe and the cooperation of designated tribal representatives (e.g., Tribal Historic Preservation Offices and Conservation Office, elders, or others), impacts can be tracked and analyzed, and specific changes or measures can be implemented to mitigate adverse impacts.	The Las Vegas Paiute Tribe could be involved as a cooperator in the planning of recreational trails, flood control measures, and infrastructure development in order to find the best possible routes, determine places to avoid or monitor for non-sanctioned use, and suggest other means to protect resources of traditional cultural association. Continued involvement of the tribe in planning such developments and minimizing future impacts is the best mitigation measure under this alternative. Through ongoing consultation with the government of the Las Vegas Paiute Tribe and the cooperation of its designated representatives (e.g., Tribal Historic Preservation Offices and Conservation Office, elders, and others), impacts can be tracked and analyzed, and specific changes or measures can be implemented to mitigate adverse impacts.	Because the Las Vegas Paiute Tribe has determined that this alternative is unacceptable, mitigation of TCPs and the surrounding cultural landscape appears impossible from the perspective of the tribe. This could change if the tribe is involved in planned development and consulted on an ongoing basis or is involved as a cooperating entity for present and future plans. Such an agreement would need to be negotiated with the government of the Las Vegas Paiute Tribe.	Same as Alternative C.	No mitigation measures have been identified that would be acceptable to the consulting tribes regarding this alternative. The removal of the means for tribal involvement in development planning precludes the forms of mitigation suggested for other alternatives. Implementation of Alternative E would result in significant adverse impacts to TCPs and the traditional cultural landscape.	This alternative could result in significant damage and loss of resources of interest to the tribe, and tribal consultation has concluded that it is even less acceptable to the Las Vegas Paiute Tribe than the other alternatives that have potentially significant adverse effects that might not be mitigated, such as Alternative E. Mitigation and avoidance of adverse impacts would need to take place on a case-by-case basis; therefore, the potential for the loss of resources would be difficult to mitigate programmatically, which is possible under some of the other alternatives.
Paleontological Resources	See Section 4.6.9 for additional details. The four interrelated paleontological mitigation components include 1. Collection of all previously recorded scientifically significant surface fossils that will not be preserved or displayed in situ from within the boundaries of the CTA as soon as feasible in order to prevent loss from vandalism, theft, and natural weathering processes. 2. Mitigation monitoring of all surface-disturbing development activities in order to prevent destruction of scientifically significant subsurface fossils contained within strata of the LVF. 3. Development of in situ paleontological interpretive displays that may include fossil specimens and implementation of in situ preservation of important fossil localities as appropriate. 4. Under the direction of the BLM or other CTA management authority, establishment of an ongoing paleontological survey and monitoring program designed to periodically check for newly exposed fossil remains and monitor the status of in situ preserved localities. Mitigation of direct impacts under Alternative A will include paleontological monitoring of surface-disturbing activities, salvage of unearthed fossils, and transfer of these fossils to a public museum, where they will be housed in perpetuity and available for scientific research, education, and display. Mitigation of indirect impacts will include the regulation of public access to the CTA by promoting the use of established roads and trails, providing educational interpretive displays highlighting the paleontological resources of the area, protecting in situ fossils associated with interpretive displays with protective barriers, and generally educating the community about the scientific importance of the paleontological resources of the LVF.	Same as Alternative A. Indirect impacts mitigation measures would be identical to those for Alternative A, but with the addition of locating off-trail hiking opportunities to areas in which surface fossils have already been collected or are otherwise less sensitive.	Same as Alternative B.	Same as Alternative A. Additional mitigation of direct impacts would include paleontological monitoring of surface-disturbing activities, salvage of unearthed fossils, and transfer of these fossils to a public museum where they would be housed in perpetuity and available for scientific research, education, and display. Additional mitigation of indirect impacts would include the regulation of public access to the CTA by promoting the use of established roads and trails, locating non-mechanized cross-country travel in areas where surface fossils have already been collected or are otherwise less sensitive, providing educational interpretive displays highlighting the paleontological resources of the area, protecting in situ fossils associated with interpretive displays with protective barriers, and generally educating the community about the scientific importance of the paleontological resources of the LVF.	Same as Alternative B.	Same as Alternative B.

Table 4.14-3. Identified Mitigation Measures by Alternative (Continued)

Resource	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	No-Action Alternative
Visual Resources	Paint the equestrian boarding facilities a suitable color to reduce the contrast of the structures on the landscape. Use the natural topography and vegetation on the landscape to screen the view of multi-use trails in the CTA. Use shields to direct nighttime lighting along Decatur Boulevard, Grand Teton Drive, and Aliante Parkway downward to reduce the glare on night skies.	Paint the equestrian boarding facilities a suitable color to reduce the contrast of the structures on the landscape. Use the natural topography and vegetation on the landscape to screen the view of trails in the CTA. Use shields to direct nighttime lighting along new roads downward to reduce the glare on night skies. Use design elements such as colored concrete across the bajadas at the base of the DNWR.	Paint the equestrian boarding facilities a suitable color to reduce the contrast of the structures on the landscape. Use the natural topography and vegetation on the landscape to screen the view of trails in the CTA. Use shields to direct nighttime lighting along new roads downward to reduce the glare on night skies. Reshape and recontour cut and fill slopes (for road construction) that cross the natural grade/slope of the bajada. Replant vegetation on the detention structure, in the basin, and in the wash below the structure to accelerate reclamation of disturbed surfaces resulting from construction of the basin. Paint transmission line poles a color that blends in with the background landscape.	Paint the equestrian boarding facilities a suitable color to reduce the contrast of the structures on the landscape. Use the natural topography and vegetation on the landscape to screen the view of multi-use trails in the CTA. Use shields to direct nighttime lighting along roads downward to reduce the glare on night skies. Reshape and recontour cut and fill slopes (for road and utility construction) that cross the natural grade/slope of the bajada. Replant vegetation on the detention structures, in the basins, and in the wash below the structures to accelerate reclamation of disturbed surfaces resulting from construction of the two basins. Paint transmission line poles a color that blends in with the background landscape.	Use the natural topography and vegetation on the landscape to screen the view of multi-use trails in the CTA. Use shields to direct nighttime lighting along roads downward to reduce the glare on night skies. Reshape and recontour cut and fill slopes (for road and utility construction) that cross the natural grade/slope of the bajada. Replant vegetation on the detention structures, in the basins, and in the wash below the structures to accelerate reclamation of disturbed surfaces resulting from construction of the two basins. Paint transmission line poles a color that blends in with the background landscape.	Reshape and recontour cut and fill slopes that are disturbed during road and utility construction. Paint transmission line poles a color that blends in with the background landscape.
Land Use	No specific mitigation measures have been identified at this time to reduce impacts to land uses under this alternative, either within or outside the CTA. Mitigation measures will be identified when site-specific environmental analyses are prepared prior to implementation of specific actions.	None	None	None	None	None
Recreation	None	None	None	None	None	None
Transportation	None	BMPs for traffic control would be implemented to minimize the level of impacts from construction projects associated with private development. Prior to any construction taking place, builders should consult with NDOT and RTC to develop traffic control plans.	Same as Alternative B.	Same as Alternative B.	Impacts would be mitigated in the long term through implementation of elements of the RTC transportation plan, including additional road capacity, roadway improvements, congestion management programs, expanded transit options, and alternative forms of transportation, including pedestrian and bicycle (RTC 2008).	Same as Alternative E.
Noise	BMPs for construction would be implemented to minimize the level of impacts from potential construction noise associated with future development actions.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
Socioeconomics	None	None	None	None	None	None
Hazardous Materials	BLM shall conduct an assessment of the site to determine whether hazardous materials exist on the property. If such materials are found to be present, BLM shall conduct remediation activities to remove the materials from the site. These actions shall occur prior to disposal or leasing of this property.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

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Chapter 5

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

A commitment of resources is irreversible when its primary or secondary impacts limit the future option for a resource. An irretrievable commitment refers to the use or consumption of resources that is neither renewable nor recoverable for later use by future generations. The commitment of resources refers primarily to the use of nonrenewable resources such as fossil fuels, water, labor, and electricity. Because this is a supplemental analysis to the LVVDB FEIS, the expected changes resulting from alternative CTA boundaries are similar to those described in the LVVDB FEIS and could include the commitment of land, physical changes in the environment, effects on human populations, and fiscal changes.

The disposal of land from the CTA study area, under the alternatives, would result in direct impacts to the environment. Each alternative involves the transfer of title of BLM lands to public or private entities. As such, there would be no direct commitment of resources. However, once the transfer of title is complete, it is expected that the disposed lands would be developed. Construction and operation associated with private development would result in an irretrievable and irreversible commitment of natural, physical, and cultural resources.

Construction activities would require the use of fossil fuels for electricity and for the operation of vehicles and equipment. Use of raw building materials for construction would be an irretrievable commitment of resources from which these materials are produced. The use of water for dust abatement during construction activities would be irreversible. Development of lands would also require labor that would otherwise be available for other projects. Commitment of labor and fiscal resources to develop the land is considered irretrievable.

An irreversible and irretrievable loss of existing resources within the CTA study area would also occur as a result of Alternatives B–E and the No-Action Alternative. Resources lost would include permanent loss of varying amounts of soils, vegetation, cultural and Native American sites, and fossils. The visual quality of the area would also diminish, as disposal alternatives would result in increased development on a natural landscape.

Irreversible loss of biological resources would occur under disposal alternatives. These losses would include individual plants, and habitat. Specifically, the individuals of bearpoppy and buckwheat that inhabit the existing BLM lands would be destroyed or displaced as incrementally more development occurs and subsequent loss of habitat takes place.

Under the NHPA, cultural resources eligible for listing in the NRHP would be protected from development. Development of disposal lands would result in the irretrievable loss of unidentified cultural resources. In addition, Native American resources, once destroyed or altered, cannot be replaced. Any loss of TCPs would be considered irreversible and irretrievable.

Both known and unknown paleontological resources located within the disposal boundaries would be irretrievably lost during development of the lands. Although some protection has been afforded under the varying alternatives, this protection cannot be guaranteed once the BLM performs title transfers to public or private entities. As such, the scientific and educational information these resources may provide would be irreversibly lost.

5.1 UNAVOIDABLE ADVERSE IMPACTS

Certain adverse impacts cannot be avoided with the application of mitigation measures. Additionally, implementation of any land disposal action would have unavoidable direct, adverse impacts to the continued availability of BLM-managed lands within the LVV.

Unavoidable indirect impacts resulting from disposal alternatives include fugitive dust and exhaust emissions from construction activities, soil and wind erosion, water quality impacts from stormwater runoff, loss of vegetation, disturbance of cultural and paleontological resources, loss of natural viewsheds, decreased opportunities for dispersed recreation, and increased dumping of household waste or debris in open lands as a result of encroaching development.

5.2 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Pursuant to NEPA regulations [40 CFR 1502.16], an EIS must consider the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity.

Because this is a supplemental analysis to the LVVDB FEIS, the relationship between short-term uses and long-term productivity is similar to that described in the LVVDB FEIS. Management of BLM land is primarily for the long-term productivity of sensitive plant species, paleontological resources, cultural resources, and certain dispersed recreation opportunities. For the purposes of this SEIS, short term is defined as the remainder of the planning period through 2018, and long term is defined as the disposal and full build-out of all remaining BLM lands within the disposal boundary, whenever that may be.

The process of land disposal under the alternatives would result in the short-term uses of physical, natural, and cultural resources. The short-term effects of land disposal under the alternatives would consist of a temporary loss of access to some recreational opportunities, potential loss of undocumented cultural and paleontological resources, and construction-related impacts consisting of increases in localized noise, dust, traffic, and vehicular emissions. Long-term environmental impacts include increased noise, air emissions, and loss of open space as population locates to disposal areas.

Short-term use of the labor force would result in long-term productivity of the economic environment, including employment, personal income, and tax revenue. Long-term benefits include the provision of new local housing and employment opportunities. Disposal may also serve as a catalyst for other economic growth in the area. The disposal alternatives would also provide short- and long-term employment opportunities. Short-term employment would be related to construction activities. Long-term employment would relate to the addition of commercial and economic development opportunities realized under varying disposal alternatives.

Chapter 6
CONSULTATION AND COORDINATION

This chapter describes public participation opportunities made available by the BLM prior to and during preparation of the SEIS. Consultation and coordination help determine whether BLM actions are consistent with other agencies' land use and development plans. As part of the NEPA process, coordination with federal, state, and local agencies, Native American tribes, and the general public took place to ensure informed decision-making.

6.1 PUBLIC PARTICIPATION PROCESS

6.1.1 Pre-scoping

Between the publication of the ROD for the LVVDB EIS and the initiation of the scoping period for this SEIS, the BLM Las Vegas Field Office engaged in a pre-scoping process relating to the CTA. The process included meetings from November 2004 through June 2007, each composed of varying stakeholders and interested members of the public. The meetings primarily dealt with concerns of stakeholder groups, including state, federal, and local government, non-profit organizations, and utility groups on how to manage the CTA and mitigate potential impacts to the area.

More than 160 individuals participated in the pre-scoping process. From this larger group, Task Groups were formed to provide input on behalf of 1) the City of Las Vegas; 2) the City of North Las Vegas; 3) Conservation; 4) Recreation; 5) Regional Entities (flood, water, transportation); 6) State of Nevada; 7) USFWS (both Ecological Services and Refuge); 8) Clark County; 9) Education/Research; 10) Utilities; 11) Builders/Developers; 12) Native American; and 13) BLM (*ex officio*). The monthly meetings were all open to the public.

Over a 10-month period in 2005, BLM received preliminary input on a variety of topics, including vision statements, goals and objectives, boundaries, infrastructure, recreation, education, and management options. After the final Task Group Meeting in August 2005, BLM used this input to develop an initial set of five alternatives for a NEPA document. These Draft Alternatives were sent out to the broader public for review in early October 2005. BLM received 21 responses, half of them from individuals. Two comments were out of state. Other than the cities, the overwhelming response was to save the largest area of the CTA. Originally, this document was planned as an Environmental Assessment. However, because of the high degree of complexity, level of controversy, levels of uncertainty, and the results of pre-scoping activities, the BLM decided to move forward with an SEIS process. The stakeholder and working group processes helped to provide a basis for discussions that lead to the draft SEIS process. The task group meetings continued until June 2007, when the BLM began plans for an official public scoping period for the SEIS. During this time, the BLM has continued to provide quarterly progress reports to task group members.

6.1.2 Scoping

The purpose of scoping is to provide an opportunity for members of the public to learn about the proposed project and to share any concerns or comments they may have. Input from the public scoping process is used to help the BLM identify a range of alternatives as well as to identify issues and concerns to be considered in the SEIS. In addition, the scoping process helps identify any issues that are not

considered significant and can therefore be eliminated from detailed analysis in the SEIS. The list of stakeholders and other interested parties is also updated and generally expanded during the scoping process.

The BLM Las Vegas Field Office hosted three scoping meetings throughout the LVV on August 14, 15, and 16, 2007, to provide the public an opportunity to learn about the project and provide comments. One meeting was held at the BLM offices on Torrey Pines Drive. The two other meetings were held in the West Charleston Library and North Las Vegas Library to ensure convenient access to interested parties. An open-house format was used to encourage two-way dialogue and to encourage discussions about issues to be addressed in the CTA SEIS; concerns with the process; and development of the range of alternatives to be analyzed in the draft CTA SEIS. Several informational posters were on display that described potential alternative boundaries and allowable uses for the CTA. A 45-day scoping comment period was provided to submit written comments related to CTA SEIS issues.

The scoping meetings were advertised in the *Federal Register* and the *Las Vegas Review Journal,* in an email to the BLM CTA stakeholder mailing list, and on the BLM Las Vegas Field Office website at <http://www.nv.blm.gov> two weeks prior to their scheduled dates. The BLM Las Vegas Field Office has maintained a link on the website for the CTA SEIS to provide information to the public regarding the NEPA process, CTA SEIS schedule, public scoping, and other information pertinent to the project.

Members of the public were afforded several methods for providing comments during the scoping period. Those included multiple comment stations with comment forms, flip charts for meeting personnel to write down comments submitted verbally as requested by meeting attendees, and emails or letters sent to BLM personnel. A total of 1,183 individuals submitted comments.

The scoping period for the SEIS was initially July 6, 2007, through August 20, 2007. An announcement was made at the August 14, 2007, scoping meeting that the comment period would be extended until September 4, 2007. The scoping process and public comments summary and analysis are documented in the *Upper Las Vegas Wash Conservation Transfer Area Supplemental Environmental Impact Statement Scoping Report,* dated November 2007 (SWCA 2007).

6.1.3 Draft SEIS Public Comment Period

The CEQ regulations (40 CFR 1503.1) invite the public to review and comment on the Draft SEIS. The BLM NEPA Handbook specifies that at least 45 days be allowed for this comment period. A Notice of Availability (NOA) was published in the *Federal Register* (Vol. 75, No. 14) by the BLM on January 22, 2010, announcing the availability of the Draft SEIS for public review and comment. The initial close of the comment period was March 22, 2010.

The BLM Las Vegas Field Office hosted three public hearings throughout the LVV on February 22, 23, and 24, 2010, to provide the public with an opportunity to comment on the potential environmental impacts described for the alternatives in the Draft SEIS. Meetings included a brief presentation describing the purpose of and need for determining a final CTA boundary, the alternatives, and the next steps. A court reporter was in attendance to record comments received from members of the public.

At the request of the public, the BLM extended the public comment period. A second NOA was published in the *Federal Register* (Vol. 75, No. 54) by the BLM on March 22, 2010, announcing that the public would have an additional 60 days to provide comments to the BLM on the Draft SEIS. No additional public hearings were scheduled. The comment period closed on May 24, 2010.

Written comments were accepted at the public hearings, via email, and mail. The official close of the comment period was May 24, 2010. All comments received and the associated responses are provided in Appendix N of this Final SEIS, which can be found on the CD inserted in the back cover pocket, or as a hard copy from the BLM if requested.

6.2 AGENCY CONSULTATION AND COORDINATION

Early and frequent coordination with affected agencies is emphasized in CEQ regulations and is directed by BLM guidance. The BLM is also required by law and regulation to consult with specific agencies and entities because of jurisdictional responsibilities.

6.2.1 Cooperating Agencies

As defined by CEQ regulations, a cooperating agency is one that has special expertise with respect to an environmental issue and/or has jurisdiction by law. The BLM invited 10 federal, state, and local governments to be cooperating agencies for the preparation of the CTA SEIS. The following agencies have accepted the invitation and signed a Memorandum of Understanding with the BLM:

- U.S. Fish and Wildlife Service
- Federal Highway Administration
- Las Vegas Paiute Tribe
- Clark County
- City of Las Vegas
- City of North Las Vegas

The BLM met with each of the cooperating agencies on an individual basis between October and December 2008. The purpose of these meetings was to present the alternatives analyzed in the draft SEIS, including the BLM Preferred Alternative, and describe the approach to the environmental impacts analysis. Throughout the process, the BLM has also had regular meetings with the Cities of Las Vegas and North Las Vegas that included updates on the CTA SEIS.

6.2.2 State Historic Preservation Office

BLM consults with the SHPO in accordance with Section 106 of the NHPA when BLM actions may affect cultural properties. The entire area of the CTA SEIS has been inventoried for cultural resources, and BLM has completed consultation with the Nevada SHPO on determinations of eligibilities for cultural resources located within the CTA SEIS project area. BLM has prepared an HPTP for those eligible cultural sites for review by the SHPO. Since this consultation process involves sensitive data, such as the location of sites, this process is not generally open to the public.

6.2.3 Native American Tribes

BLM consults with Native American Tribes to identify cultural values, religious beliefs, and cultural values that may be affected by BLM actions. The NHPA is the basis for tribal consultation provisions. BLM used a two-phased approach to fulfill the objective of consultation with Native American tribes and identification of any TCPs within the project area. First, BLM completed an intensive review of ethnographic literature relevant to the geographic region that encompasses the project area to identify previously documented TCPs and Native American tribes with traditional concerns in the area. Second,

consultation letters were submitted to the Southern Paiute. Follow-up calls were made to discuss initial reactions and concerns. BLM met with representatives of the Las Vegas Paiute tribe on May 6, 2008, to get their views on the alternatives being analyzed in the SEIS. Tribal consultation has occurred throughout the CTA SEIS process. Additionally, tribal members and the general public had the opportunity to comment during the public meetings held during the scoping period.

6.2.4 U.S. Fish and Wildlife Service

The ESA requires all federal agencies to participate in the conservation of endangered species. Specifically, Section 7 of the ESA charges federal agencies to aid in the conservation of listed species and ensure that their activities are not likely to jeopardize the continued existence of listed species or adversely modify designated Critical Habitats. In addition, BLM cannot undertake actions that will lead to the listing of a species under the ESA.

Formal Section 7 Consultation with USFWS was initiated in October 2003 for potential effects from expansion of the disposal boundary, including the Conservation Transfer Alternative, on the desert tortoise. USFWS issued a programmatic Biological Opinion in December 2004. At the request of BLM, USFWS included recommendations for conservation of the Las Vegas buckwheat as well. The development of trails in the CTA study area was not specifically addressed in the 2004 Biological Opinion. To supplement the 2004 Biological Opinion, the BLM has prepared a Biological Evaluation for the future development of trails that could potentially be developed under the CTA SEIS Preferred Alternative.

6.3 DISTRIBUTION LIST

U.S. Congress

Federal Agencies

Nevada State Agencies

6.3.1 Local Governments

Clark County

City of Las Vegas

City of North Las Vegas

6.3.2 Native American Tribes

Las Vegas Paiute Tribe

Chapter 7

LIST OF PREPARERS

This document was prepared and reviewed by a team from the BLM Las Vegas District Office and a team associated with SWCA. Team members are identified with their titles, roles, experience, and education in Table 7-1.

Table 7-1. List of Preparers

Organization	Name	Project Role	Years of Experience	Education
BLM	Gayle Marrs-Smith	Project Manager, Botany	15	MS Botany
BLM	Sarah Peterson	Hydrology	10	MS Hydrology
BLM	Jeff Steinmetz	Lead Planning and Environmental Coordinator	31	BS Range Management
BLM	Susanne Rowe	Archaeology, Paleontology	9	MA Anthropology
BLM	George Varhalmi	Minerals	10	MS Geology
BLM	Mark Slaughter	Biological Resources	6	BS Biology
BLM	Cheryl Cote	Realty Specialist	17	BLM Lands Academy
BLM	Lew Brownfield	GIS Specialist	10	BS Geography
SWCA	Charles Coyle	Project Manager	10	BA English, MA English
SWCA	Al Herson	NEPA Quality Assurance Review	30	JD, MA Urban Planning
SWCA	Jeff Connell	Principal in Charge, Public Involvement, Socioeconomics	30	AICP, MA
SWCA	David Brown	Planning Coordinator, Public Involvement	7	MLA
SWCA	Eric Koster	Assistant Project Manager, Biological Resources	8	BA Biology
SWCA	Steve Leslie	Assistant Project Manager, Transportation and Noise	11	BS Natural Resource Management
SWCA	Justin Streit	Biological Resources	6	BS Natural Resources
SWCA	Matt Villaneva	Botany, Biological Resources	5	BS Environmental Biology, Minor in Botany
SWCA	Heather Stettler	Cultural Resources	15	BA, MA, and PhD Anthropology
SWCA	Elizabeth Perry	Tribal Coordination	13	BA, MA, and PhD Anthropology
SWCA	Steve Knox	Visual Resources, Land Use	34	BS Watershed Management
SWCA	David Reinhart	Lead GIS Specialist	9	BS Anthropology, GIS certificate
SWCA	Barbara Stone	GIS	3	BS Fisheries and Wildlife
SWCA	Allen Stutz	GIS Specialist, Geospatial Analysis	1 year	BS Conservation, Ecology and Evolution, BS Zoology, Certificate of Advanced Study in GIS

Table 7-1. List of Preparers (Continued)

Organization	Name	Project Role	Years of Experience	Education
SWCA	Paul Murphy	Principal Investigator, Paleontology	26	BS Anthropology/Biology, MS and PhD Geological Sciences (Paleontology Emphasis)
SWCA	Jessica DeBusk	Paleontology	6	BS Geology (Emphasis in Paleobiology)
SWCA	Camille Ensle	Publication Specialist	10	BA Studio Art in progress
SWCA	Heidi Orcutt-Gachiri	Editor	8	PhD Linguistics and Anthropology, MA Linguistics, MA Philosophy
SWCA	Benjamin Gaddis	Public Scoping and Comment Analysis Scoping report primary author	8	BS Environmental Science, MEM Water Resources
SWCA	Elisha Hornung	Public Scoping and Comment Analysis	8	BS Environmental Studies
SWCA	Megan Nelson	Public Scoping and Comment Analysis, Comment Analyst	2	BA English
SWCA	Janet Guinn	Public Scoping and Comment Analysis, Scoping Report	9	BS Psychology and Anthropology
SWCA	Lesley Hanson	Biological Resources	4	BS Biology
SWCA	Harmony Hall	Recreation	8	BS Natural Resources
SWCA	Claire Bingaman	Recreation, Socioeconomics, Environmental Justice	2	BS Environmental Science, MA Urban and Environmental Planning
SWCA	Cara Bellavia	Socioeconomics	8	MUEP
SWCA	Kelli Nagamine	Administrative Record	5	BA
Zeus Environmental, LLC	Carrie Stewart	NEPA Quality Assurance	20	BS Geology, MA Computer and Information Systems, MA Human Resources and Development
Kleinfelder	Darcy Anderson	Project Manager, Air Quality QA/QC	25	MS Meteorology, MS Hydrology
Kleinfelder	Michael Langley	Senior NEPA Specialist	25	BS Meteorology
Kleinfelder	Charles Larson	Hydrology/Erosion	25	MS Engineering
Kleinfelder	Travis Kluthe	Surface Water Modeling	2	BS Geological Engineering
Kleinfelder	Dan Burns	Hazardous Materials	23	BS Geology, BS Civil Engineering
Kleinfelder	Doug Davis	Geology and Soils	18	MS Geology
Kleinfelder	Karin Hagan	Earth Resources	10	MS Geology, MS GIS
Kleinfelder	Ryan Eberle	Air Quality	10	BS Environmental Engineering
Kleinfelder	Sarah Walters	Air Quality	5	MS Hydrology
Kleinfelder	Jodi Strohmayer	Environmental Planner, Archaeologist	6	MS GIS, Archaeology

Chapter 8

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Chapter 9

GLOSSARY

100-year flood. A flood event of such magnitude that it occurs, on average, every 100 years. This equates to a 1% probability of its occurring in any given year.

Acre-foot. A measure of volume of water. The amount of water it would take to cover 1 acre of land to a depth of 1 foot; equal to 325,851 gallons or 43,560 cubic feet.

Affected environment. Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action.

Air quality. The cleanliness of the air as measured by the levels of pollutants relative to standards or guideline levels established to protect human health and welfare.

Alluvial fan. A broad, conical deposit of sediment typically found at the edge of mountain ranges, dissected by channels and composed of coarse-grained material, including sand, gravel, cobbles, and boulders.

Alluvium. Any stream-laid sediment deposit.

Ambient. Surrounding or background conditions in the absence of an identifiable source.

Ambient air. That portion of the atmosphere, outside buildings, to which the general public has access.

Ambient Air Quality Standards. Standards established on a state or federal level that define the limits for airborne concentrations of designated criteria pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, particulate matter with aerodynamic diameters less than 10 microns [PM10), ozone, and lead) to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

Aquifer. A body of rock that contains enough saturated, permeable material to transmit groundwater and to yield significant quantities of groundwater to wells and springs.

Area of Critical Environmental Concern. A Bureau of Land Management designation for an area within public lands in which special management is required in order to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life from natural hazards.

Artesian. Refers to groundwater under sufficient hydrostatic head to rise above the aquifer that contains it.

Assessment (Environmental). An evaluation of existing resources and potential impacts to them from a proposed act or change to the environment.

Attainment area. A region that meets the National Ambient Air Quality Standards for a criteria pollutant under the Clean Air Act.

Baseline. The initial environmental conditions against which the environmental consequences of the alternatives are evaluated.

Candidate species. Species for which the U.S. Fish and Wildlife Service has sufficient information on file regarding biological vulnerability and threat(s) to support the issuance of a proposed rule to list but issuance of the proposed rule is precluded.

Criteria pollutant. Common air pollutant for which the U.S. Environmental Protection Agency has established a maximum exposure standard based on scientific knowledge regarding the pollutant's health effects. Criteria pollutants include sulfur dioxide, carbon monoxide, particulate matter less than 10 microns in diameter, particulate matter less than 2.5 microns in diameter, nitrogen dioxide, ozone, and lead.

Cumulative impact. A cumulative impact is the environmental impact resulting from the incremental impacts of a particular activity when added to other past, present, or future activities. Cumulative impacts may be individually insignificant, but collectively, the individually insignificant activities may become significant.

Detention basin. A basin designed to hold floodwaters.

Diagnostic remains. "Diagnostic" refers to the usefulness of the fossil with respect to obtaining information of scientific worth.

Direct effect. Beneficial or adverse impact that is caused by an action and occurs at the same time and place.

Disposal boundary area. The land area within the boundary established by the Southern Nevada Public Land Management Act of 1998 and as expanded by the Clark County Conservation of Public Land and Natural Resources Act of 2002.

Distance zones. A subdivision of the landscape as viewed from an observer position. The subdivision (zones) includes foreground–middle ground, background, and seldom seen.

Endangered species. A plant or animal species that is threatened with extinction or serious depletion in its range and is formally listed as such by the U.S. Fish and Wildlife Service.

Endemic environment. Plants or animals that are native to a particular region; the surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

Environmental Impact Statement. A detailed written statement that helps public officials to make decisions based on an understanding of the environmental consequences and to take actions that protect, restore, and enhance the environment.

Ephemeral. Lasting only a brief period of time.

Ephemeral stream. A stream or portion of a stream that flows only in direct response to precipitation.

Evapotranspiration. The loss of water from the soil both by evaporation and by transpiration from the plants growing there.

Fault. A fracture or fracture zone in the earth's surface along which there has been displacement of the sides relative to one another parallel to the fracture.

Floodplain. That portion of a river or stream valley, adjacent to the river channel, which is built of sediments and is inundated with water when the stream overflows its banks.

Form. The mass or shape of an object or objects, which appears unified.

Fossil. The remains or traces of an organism or assemblage of organisms that have been preserved by natural processes in the earth's crust, excluding organisms that have been buried since the beginning of historical time.

Fossiliferous. Containing fossils.

Fugitive dust. Particulate matter composed of soil. Fugitive dust may include emissions from haul roads, wind erosion of exposed soil surfaces, and other activities in which soil is either removed or redistributed.

Geological. Any natural process acting as a dynamic physical force on the earth, e.g., faulting, erosion, and mountain-building resulting in rock formations.

Groundwater recharge. Water that infiltrates the land surface and is not lost to evaporation or consumed by plants can percolate downward and replenish the groundwater aquifers. This deep percolation is called recharge.

Habitat. The region in which a plant or animal natural grows or lives. A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and home range.

Hazardous waste. Waste that is designated hazardous by the U.S. Environmental Protection Agency or state regulations. As defined under the Resource Conservation and Recovery Act, hazardous waste is waste from production or operation activities that pose a potential hazard to human health or the environment when improperly treated, stored, or disposed of. Hazardous waste that appears on special Environmental Protection Agency lists or possesses at least one of the four following characteristics: ignitability, corrosivity, reactivity, or toxicity.

Human environment. The natural and physical environment and the relationship between people and the environment.

Hydrology. A science that studies the properties, distribution, and circulation of water on and below the earth's surface and in the atmosphere.

Impact. The terms "impacts" and "effects" are synonymous as used in the National Environmental Policy Act. Impacts may be beneficial or adverse and may apply to the natural, aesthetic, historic, cultural, and socioeconomic resources of the installation and the surrounding communities. Where applicable, impacts may be classified as direct or indirect.

Indirect impact. An indirect impact is caused by a proposed activity but is later in time or farther removed in distance while still being reasonably foreseeable. Indirect impacts may include land use changes or population density changes and the related effects these changes will have on air, water, and other natural or social systems.

Infiltration. Water that falls on the land surface and does not run off, instead percolating into the ground. Some of this water evaporates, some is used by plants, and some percolates downward to the groundwater.

Intermittent stream. A stream that flows only at certain times when it receives water from springs or from a surface source.

Landform. A term used to describe the many types of land surfaces that exist as a result of geological activity and weathering (e.g., plateaus, mountains, plains, and valleys).

Line. The path, real or imagined, that the eye follows when perceiving abrupt differences in form, color, or texture or when objects are aligned in a one-dimensional sequence. Usually evident in the edge of shapes or as masses in the landscape.

Lithic. Pertaining to stone or a stone tool (e.g., lithic artifact).

Locatable materials. Traditional "hard rock" minerals such as gold, silver, lead, copper, zinc, and industrial minerals such as fluorspar, barite, and high-calcium limestone that occur in lode or placer deposits.

Long-term impacts. Long-term impacts are neither temporary nor reversible. They may occur either during the construction or operational phases of an activity. For example, the construction of a new building may create long-term impacts during both the construction and operational phases. Draining of a wetland for the construction of a new building will create long-term and permanent impacts to biological resources. Likewise, once operation, the new building may create additional long-term impacts such as increased population density, waste generation, etc.

Master Plan. A document (or a set of document) that sets forth goals and policies for guiding future land use and development in a community. Also known as a Comprehensive Plan.

Migratory. Birds, animals, or people that migrate (move) from one region or country to another.

Mineral resource. Any inorganic or organic substance that occurs naturally in the earth and that has a consistent and distinctive set of physical properties. Examples of mineral resources include coal, nickel, gold, silver, and copper.

Mitigation. Mitigation generally includes the following: avoiding the impact altogether by stopping or modifying the proposed action; minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; compensating for the impact by replacing or providing substitute resources or environments.

National Ambient Air Quality Standards. Section 109 of the Clean Air Act requires the U.S. Environmental Protection Agency to set nationwide standards for widespread air pollutants. Currently, six pollutants are regulated: sulfur dioxide, carbon monoxide, PM10, nitrogen dioxide, ozone, and lead.

National Register of Historic Places. A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance established by the Historic Preservation Act of 1966 and maintained by the National Park Service.

Native vegetation. Vegetation originating in a certain region or country.

Nitrates. A water-soluble molecule made up of nitrogen and oxygen. It is formed when nitrogen from ammonia or other sources combines with oxygenated water.

No impact. "No impact" implies that a particular activity creates neither a direct nor indirect impact, does not have long- or short-term implications, and is neither beneficial nor negative.

Nonattainment area. An area that has been designated by the U.S. Environmental Protection Agency or the appropriate state air quality agency as exceeding one or more national or state Ambient Air Quality Standards.

Nonpoint source. Source of pollution generally attributed to urban runoff from irrigating landscapes and golf courses, draining pools to streets, washing vehicles in streets, and hosing down driveways.

Off-highway vehicle. Any motorized vehicle designated for cross-country travel over any type of natural terrain.

Ozone (ground level). A major ingredient in smog. Ozone is produced from reactions of hydrocarbons and nitrogen oxides in the presence of sunlight and heat.

Paleontology. The science that deals with the life of past geological ages through the study of the fossil remains of organisms.

Particulate. Fine liquid or solid particles, such as dust, smoke, mist, fumes, or smog, found in air or emissions.

Patent. A government deed; a document that conveys legal title of public lands to whom the patent is issued.

Perennial. Lasting or active through the year. May refer to rivers, streams, or plants.

Permeability. The measure of the ease with which a fluid can diffuse through a particular porous material.

Physiographic province. An area characterized by distinctive topography, geological structure, climate, drainage patterns, and other features and phenomena of nature.

Pleistocene. The first geological epoch during the Quaternary period, spanning from 1.8 million years ago to about 9000 B.C., characterized by extensive continental glaciation in the Northern Hemisphere.

Point source. Any discernible, confined, and discrete conveyance, including any pipe, ditch, channel, tunnel, or conduit from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture.

Quaternary. The geological period following the Tertiary in the Cenozoic Era, beginning about 1.8 million years ago, composed of the Pleistocene and Holocene epochs, characterized by the evolution of hominids into modern humans.

Range. A large, open area of land over which livestock can wander and graze.

Rare. A plant or animal restricted in distribution. May be locally abundant in a limited area or few in number over a wide area.

Record of Decision. A public document that explains which alternative will be selected for the area of concern.

Region. A large tract of land generally recognized as having similar character types and physiographic types.

Region of Influence. The geographical area to be addressed as the baseline from which to identify and evaluate environmental changes resulting from the proposed alternatives. The region of influence may vary for each resource area.

Right-of-way. Strip of land acquired by legal means, over which the power line and access roads would pass.

Riparian. The banks of a body of water.

Salable minerals. Common variety mineral materials such as sand, gravel, cinders, and building stone that are sold on a permit basis. Also referred to as mineral materials.

Scope. The range of actions, alternatives, and impacts to be considered in an Environmental Impact Statement.

Sediment. Solid fragmented material, either mineral and organic, that is transported or deposited by air, water, gravity, or ice.

Sensitive species. Species whose populations are small and widely dispersed or restricted to a few localities; species that are listed or candidates for listing by the state or federal government.

Sensitivity level. A measure of public concern for scenic quality based on various indicators of public concern.

Short-term impacts. Short-term impacts are temporary and either direct or indirect. Short-term impacts usually occur during the construction phase of the activity.

Significance. Significance requires consideration of the context and intensity of the impact or effect under consideration. Significance can vary in relation to the context of the proposed action. Both short- and long-term effects may be relevant. Impacts may also be evaluated in terms of their intensity or severity.

Socioeconomic. Have or involving both social and economic factors. A given geographical area delineated for specific research.

Species. A group of individuals of common ancestry that closely resemble each other structurally and physiologically, and in nature interbreed, producing fertile offspring.

Stratigraphic. Division of geology dealing with the definition and description of rocks and soils, especially sedimentary rocks.

Subsidence. The gradual settling or sinking of an area, usually due to the withdrawal of large amounts of groundwater.

Subsurface. A zone below the surface of the earth whose geological features are principally layers of rock that have been tilted or faulted and are interpreted on the basis of drill hole records and geophysical (seismic or rock vibration) evidence. Generally, it is all rock and solid materials lying beneath the earth's surface.

Texture. The aggregation of small forms or color mixtures into a continuous surface pattern; the aggregated parts are enough that they do not appear as discrete objects in the composition of the scene.

Threatened species. A species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Traditional cultural property. A location that is valued by some group, such as an ethnic group, because it is a place of cultural patrimony and an important place in the traditional cultural landscape.

Tributary. Any stream or wash that contributes water to another stream or wash.

Unemployment rate. The unemployment rate represents the number unemployed as a percent of the labor force.

Viewshed. Visible portion of the specific landscape seen from a specific viewpoint, normally limited landform, vegetation, distance, and existing cultural modifications.

Waters of the U.S. Water such as intrastate lakes, rivers, streams (including intermitted streams).

Watershed. A region or area bounded peripherally by a water parting and draining ultimately to a particular body of water.

Wetlands. An area that is regularly saturated by surface water or groundwater and subsequently supports vegetation that is adopted for life in saturated soil conditions. To qualify as a U.S. Army Corps of Engineers jurisdictional wetland, it must have hydric soil, be saturated to the surface sometime during the growing season, and contain wetland plant species.

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